# Appendix D – Response to Comments

A notice that the Draft EIS was available for review was published in the Federal Register on November 22, 2013. The Draft EIS was available for public review and comment from November 22, 2013 to January 6, 2014. Notices about the opportunity to comment were sent to 49 individuals, organizations, government agencies, tribal governments including federally recognized tribal governments, tribal groups currently applying for federal recognition, and Native American organizations and non-profit groups that are interested in projects that are located on this portion of the Forest or who requested notification on the project.

During the comment period the Forest Service heard from 6 individuals or groups. Public concerns reflected a broad range of views related to the proposed project and analysis. Individual commenters and the comments are identified by number below.

(1) Comments were submitted on behalf of Californian Forestry Association (CFA) in support of the project Alternatives 1 and 5. Additionally, some clarification and additional information was requested.

(2) Comments were submitted on behalf of Sierra Pacific Industries (SPI) in support of project Alternative 1.

(3) Comments were submitted on behalf of Sierra Forest Legacy (SFL) in support of project Alternative 4 and offering additional documents in support of that alternative.

(4) Comments were submitted on behalf of the Shingle Springs Rancheria (SSR) requesting further information and requesting consultation as the project progresses.

(5) Comments were submitted on behalf of the Environmental Protection Agency (EPA) in support of project activities.

(6) Comments were submitted by Dick Artley of Grangeville, Idaho (DA) with concerns relative to project impacts that would occur due to timber harvest, road building and pesticide use, identifying insufficient information relative to proposed activities, and requesting additional analysis and review. The comment letter from Mr. Artley included multiple attachments containing "opposing views" related to timber harvest activities, road work and herbicide in general, but were not specific to the project. The opposing views were reviewed, and consisted of short quotations from various sources, including quotations from the scientific gray literature, primary science, and popular press. The opposing views were reviewed to determine which opposing views were related to the comments provided by the interested party. Opposing views not related to the comments were not considered in greater depth.

**CFA-1)** Other than Chipmunk Creek, all other watersheds in the project area are very high to extreme fire hazard. Implementation of the proposed action (Alternative 1) only reduces potential crown fire from 70% to 60%. Implementation of Alternative 5, with additional intensive thinning on ridge tops, would further meet the fuels objective by reducing crown bulk density, which decreases the potential for an active crown fire to occur.

***Response**: Support for an Alternative 5. Increased benefits for modifying fuels are discussed in the fuels analysis for the alternative.*

**CFA-2)** On the Moonlight Fire, 23 CA Spotted Owl PACs were incinerated. At least 30 PACs have been incinerated on the Plumas and Lassen NFs in the past 6 years. On the Rim Fire, 22 of the total 46 PACs were either partially or totally incinerated. Former U.S. Fish and Wildlife Service Regional Director, Steve Thompson, has publically stated the biggest threat to the CA Spotted Owl is catastrophic wildfire. A large wildfire within the Blacksmith project area also then puts adjacent private forest land holdings at risk.

***Response**: Protection of spotted owl PACs within the area is a part of the purpose and need for the project.*

**CFA-3)** Since Alternative 5 would likely require a Forest Plan Amendment (adjustment to 2004 Sierra Nevada Framework standards and guidelines) for Spotted Owl and perhaps for Goshawk, and you are not proposing a Forest Plan Amendment, I don't believe Alternative 5 can be selected. Therefore, CFA encourages the decision maker to select the proposed action. A significant reduction in tree density and understory fuels reduction is a step in the right direction.

***Response**: A site specific Forest Plan Amendment is proposed as part of Alternative 5. The site specific amendment was described in the Draft EIS and was analyzed by resource area in the Draft EIS. For the final EIS the amendment and the fact it is proposed as part of Alternative 5 is clarified.*

**CFA-4)** Was the Rubicon River segment north of the Ellicott Bridge analyzed and published as being eligible? Was it for Wild or for Scenic?

***Response*:** *In 1979 the Rubicon River was designated a 'Wild Trout' river from Hell Hole dam to Ralston Afterbay by the State of California. As part of the Eldorado National Forest (ENF) Land and Resources Management Plan (1988 LRMP), the ENF conducted the eligibility of the full length of the Rubicon River. The upper Rubicon, above Hell Hole Reservoir was found not eligible, and the lower Rubicon, below Hell Hole Dam was found eligible. The ENF-LRMP recommended all three segments of the lower Rubicon River for scenic river designation. However, the classification for the river in the ENF-LRMP was appealed, and in a subsequent decision by the Chief of the Forest Service, the two lower segments, from Ellicott Bridge to Ralston Afterbay were recommended for Wild classification in addition to Scenic classification. The upper segment, from 100 yards below the Hell Hole Dam to Ellicott Bridge, continues to have a Scenic classification (S. Rodman pers. comm.). The ENF formally recommended that Congress designate the Rubicon River under the Wild and Scenic Rivers system (S. Rodman pers. comm.). However, the United States Congress has not yet acted to officially designate the river. Regardless, the USDA-FS manages the Rubicon River, and a ¼ mile corridor, to protect the ORV's identified in their W&SR eligibility study.*

**CFA-5)** Will the red-legged frog habitat near Ralston Pond be flagged? Likely only a very small part of Units 321-2, 321-4, 325-1, 325-3, 325-7, 325-8, 325-9 and 325-10 are frog habitat.

***Response:** Because during periods of wet weather, starting with the first rains of fall, some individuals make overland excursions through upland habitats, the distance from known or potentially suitable*

*breeding California red-legged frog habitat is one mile. Therefore the LOP would be applied to the entire unit.*

**CFA-6)** It would be uneconomic to include 17 acres of skyline in Alternative 4

***Response**: Those areas were looked at to see if there was potential to incorporate portions into neighboring ground based units and any potential skyline that is not suitable for ground based harvesting was be dropped from the final analysis of Alternative 4.*

**CFA-7)** – Publications you might be looking for –
http://www.treesearch.fs.fed.us/pubs/45212
http://treesearch.fs.fed.us/pubs/45108

***Response**: The links are for the following citations:*
*Knapp, Eric E.; Skinner, Carl N.; North, Malcolm P.; Estes, Becky L. 2013. Long-term overstory and understory change following logging and fire exclusion in a Sierra Nevada mixed-conifer forest. Forest Ecology and Management. 310: 903–914.*

*Zhang, Jianwei; Oliver, William W.; Powers, Robert F. 2013. Reevaluating the self-thinning boundary line for ponderosa pine (Pinus ponderosa) forests. Can. J. For. Res. 43: 963-971.*

*Literature provided supports project activities.*

**CFA-8)** p.47. Environmental Consequences. I think it should be noted at the start of this section that all direct and indirect effects assume that no large wildfire engulfs the project area.

***Response**: Lack of wildfire assumed in the effects analysis of no action has been added to the Final EIS vegetation analysis.*

**CFA-9)** Page 127. How could the "reduction in fire hazard and risk effects (benefits) of Alternative 5 [be] the same as Alternative 1"?

***Response:** The statement that "reduction in fire hazard and risk effects (benefits) of Alternative 5 are the same as Alternative 1" is stated in relation to effects to California spotted owl and relates to the modeled landscape fire effects for PACs. The Fuels analysis discusses differences in effects with the added acres and intensity of treatment. According to this analysis, the location of the additional acres and the ignition points used for comparison for the wildfire simulation modeling produce the same results as Alternative 1 because the additional acreage proposed for treatment with Alternative 5 compared to Alternative 1 is located in areas adjacent to proposed treatment. The additional acreage is located in area adjacent to proposed treatment in which a simulated fire did not reach during the fire simulation. The additional 100 acres of treatment further enhance the units under Alternative 1 since they adjoin those units increasing their size and effectiveness.*

*As stated in the fuels analysis, the main difference would be in the overstory canopy; the additional intensive thinning on identified ridge tops would further meet the fuels objective by reducing crown bulk density within these areas which decrease the potential for an active crown fire to occur. The additional*

*treatment on 100 acres would decrease fire behavior within treated stands to result in a surface fire, with flame lengths less than 4 feet and fireline intensities less than 100 btu/ft/sec.*

*Therefore, depending on where a fire starts and burns, additional treatments under Alternative 5 would further modify wildfire behavior in specific areas, compared to Alternative 1, however based on landscape level modeling, fire behavior modification is not notably different between the two alternatives. The statement is corrected for the Final EIS to state that effects would be similar to those described for Alternative 1.*

**CFA-10)** How do you intend to perform 8 acres of grapple piling on skyline units?

***Response:*** *The 8 acres of grapple piling proposed in skyline units is located in a moderately steep unit 323-29 where timber cutting would be accomplished with a feller-buncher and grapple piling would be feasible and not likely to result in resource damage, but where cable yarding is more desirable than ground-based skidding.*

**CFA-11)** p.160-164.
(Air Quality) – There's no display of average annual number of burn days during normal "burn windows" for prescribed burning. What is the probability that there will be sufficient burn windows on burn days to accomplish over 3,700 acres of initial underburning, over 2,000 acres pile burning and over 6,000 acres of follow-up underburning treatments. What is the current backlog on the Eldorado NF of prescribed burning acres?

***Response:*** *A range of variability exists to determine available burn days across the Eldorado National Forest (ENF) due to factors such as weather patterns, elevation, fuel conditions, multiple air quality districts and budget. Typical burn windows for implementing understory prescribed fire is spring, fall, and winter on the ENF; the Georgetown Ranger District typically implements approximately 1000 acres per year of pile and understory prescribed fire.*

*Piling of surface fuels and biomass from thinning present the best windows of opportunity to complete due to a wide range of weather conditions that pile burning could occur. Typically, piles are covered with paper to limit moisture and can be completed during cool and moist conditions. These conditions also typically bring better air quality dispersion allowing for more burn days in the winter than times when understory prescribed fire would be planned.*

*Understory prescribed burning has narrower windows associated with completing burns. A combination of factors including weather and fuel conditions, air quality, and resource availability determine if prescribed fire implementation can successfully occur. Fuel conditions need to be such that consumption of fuels would meet desired objectives for the prescribed burn.*

*The Georgetown Ranger District currently has approximately 1000 acres of machine piles and 800 acres ready for prescribed fire implementation. Other projects which have yet to begin implementation add an additional 3,500 acres of pile burning and 4,000 acres of understory fire. Much of the understory*

*prescribed fire is being coordinated with the completion of the mechanical thinning units to facilitate increasing fuel treatment areas on steeper slopes.*

**CFA-12)** p.179. (Climate Change)
A paragraph should be added that climate change likely has had some effect on the 2 ½ month increase in the length of the fire season over the past 40 years. The longer, drier, and sometimes warmer summers and warmer winters has led to an increase in the number, size and intensity of wildfires in California. Further, 3 out of 4 forested acres burned are on the national forests. The recent Rim Fire has demonstrated fire behavior like never before seen where high severity patch sizes were in the thousands of acres.

***Response:*** *The climate change analysis for the project is meant to display the effects of climate change with the project alternatives, and the relevant effects on forest resources. The fact that climate change has likely had some effect on lengthening the wildfire season as warmer weather patterns allows for fuels to dry out sooner and be available for burning is incorporated into the purpose and need for the Blacksmith project in terms of creating stand compositions and structures that are more sustainable into the future.*

*Furthermore these trends are incorporated into the fuels analysis for the project. Westerling and others found length of fire season, fire frequency and size increased over a 30 year period (Warming and earlier spring increase western U.S. forest wildfire activity, Science Magazine, 2006. pp. 943-). The fuels analysis utilizes climatological weather data to model fire behavior potential. Specifically, the Blacksmith Fuels Analysis utilizes the Bald Mountain and Hellhole Remote Automated Weather Stations, which are located within 3 to 5 miles of the project area, to determine 90$^{th}$ percentile weather conditions based on 20 years of weather data collected. Utilizing climatological and the Fire Family Plus computer program, 90$^{th}$ percentile fuel condition for dead and live fuel loads can be obtained; these values are then used in fire modeling programs along with the weather to model potential fire behavior within the treated stands for comparison of the alternatives.*

**SPI-1)** Sierra Pacific Industries (SPI) has sawmill facilities in Lincoln, Oroville, Chinese Camp, and Sonora. These sawmills are an important part of the local economy and provide family wage jobs for their employees. The forest products that are developed from projects like this contribute a significant amount of our raw material.

***Response:*** *The Eldorado recognizes the contribution of trees harvested from the National Forest to the local wood manufacturing facilities, and is committed to preservation of this infrastructure to maintain future options for efficient and effective management to achieve objectives on National Forest System lands and the social and economic value that these manufacturing facilities provide to the local community.*

**SPI-2)** Sierra Pacific Industries is supportive of the actions proposed in this project. In comparison to the other proposed alternatives, the proposed action (Alternative 1) best meets the project objectives. It is our opinion that the proposed action with its implementation of forest thinning based on information presented in PSW-GTR 220 and PSW-GTR 237 is the best compliment to improve forest health and reduce the risk of catastrophic wildfires. We believe that the proposed action gives ample consideration for wildlife habitat, including the California Spotted Owl. The retention and removal of

pockets of trees as well as the retention of structures that support higher basal area proposed in Alternative 1should provide a variety of habitats for all forest inhabitants.

***Response:*** *Thank you for your support of proposed activities and project design.*

**SPI-3)** Actions proposed in Alternative 1 will supply sawmills like ours with a much needed timber supply. The proposed action has a unique opportunity to benefit local economies as well as the health of our forested lands.

***Response:*** *Comment supports project Alternative 1. The Eldorado recognizes the contribution of trees harvested from the National Forest to the local wood manufacturing facilities, and the social and economic value that these manufacturing facilities provide to the local community. While Alternative 1 would better meet objectives to contribute to local manufacturing facilities, Alternative 4 has been developed to meet purpose and need elements for fire behavior modification and sustainability of forest stands and economic efficiency, while minimizing immediate and short term negative impacts to California spotted owl in this area of the Forest.*

**SFL-1)** Below are some brief comments in support of Alternative 4, the Reduced Spotted Owl Impacts alternative that evolved from our collaborative attempts to address multiple issues on and surrounding the Blacksmith landscape. We reviewed the DEIS and supporting documents and offer additional documents in support of a more cautious approach.

Starting with Seamens and Gutierrez 2007 and the relationship of larger proportions of higher quality habitat and site occupancy raises an issue that has become extremely important in light of recent evidence of range-wide (Lassen, Eldorado and Sierra NFs) spotted owl population declines, while one CSO study area in Sequoia National Park is increasing.

From John Keane in the 2013 PSW Science Synthesis:

> "Ongoing research of recent population trends indicates increasing evidence for population declines on the three studies on National Forest Service lands and a stable/increasing population on the National Park Service study area, and it is providing new approaches for evaluating spotted owl population trends and interpreting the probability of population declines

(Conner et al., in review; Tempel and Gutiérrez, in review)."

Recently Conner et al. 2013 went beyond looking only at annual rates of population change ($\lambda t$) using realized population change ($\Delta t$) "an encompassing metric looking at a population trend over a period of time; it is the ratio of population size at an end time period relative to initial population size. The results of the ($\Delta t$) analyses highlighted that small differences in mean $\lambda$ from 1.0 (stationary) can result in large differences in population size over a longer time period." This analysis of probability of declines verses a stationary or increasing population offer additional insight into the likelihood of declines in 2 of the CSO populations on national forest lands.

Tempel and Gutierrez 2013 determined in a tracking methods-model performance study that robust occupancy modeling compared favorable with traditional mark-recapture techniques and was more

cost effective. Additionally, the Eldorado NF study (within and adjacent to the Blacksmith project area), where they used multi-season, occupancy models to estimate that territory occupancy declined during their study (_t = 0.702, 95% CI 0.552–0.852) due to increasing territory extinction rates and decreasing colonization rates.

Finally, Doug Tempel (recent project manager of the Eldorado Spotted Owl Study) in his recently completed (2013) PhD Thesis we see even more clearly that spotted owls on the

= 0.969, 95% CR

2012 = 0.501, 95% CRI 0.383, 0.641). During the study period 1990-2012 there has been nearly a 50% loss of site occupancy. This led Dr. Tempel to conclude that the US Fish and Wildlife Service should reconsider the status of the California Spotted owl (for listing) under the Federal Endangered Species Act.

In reviewing the Blacksmith DEIS and comparing the 5 alternatives we believe that the Forest Service has a continued responsibility to balance multiple objectives in a manner that gives increasing weight to protection of biodiversity when evidence presented from multiple scientific studies is strongly suggesting the spotted owl population declines are real and alarming. Alt 4, while certainly not risk-free (DIES p. 125), was collaboratively developed with ENF staff and addresses multiple objectives successfully and as cost-effectively as other alternatives while highlighting that the Eldorado NF can respond to a definite need for increased scrutiny and focus in this challenging situation.

***Response:*** *Comments supports project Alternative 4. The Eldorado recognizes the concerns for impacts to California spotted owl in this landscape. Alternatives 1, 4, and 5 were all developed based on collaboration with leading California spotted owl researchers and members of the public. Alternative 4 would best meet objectives for reducing immediate and short term impacts to the California spotted owl, while still implementing an effective project to meet the Purpose and Need defined in the EIS. We appreciate the collaborative efforts of partners who worked with us to develop project alternatives and design elements.*

*Literature provided is consistent with the analysis for the California spotted owl in the project analysis.*

**SFL-2)** We request specific monitoring of the CSO post-treatment response to implementation of Alt 4 for 3 years post-treatment so we can understand the effects of these actions.

***Response:*** *FSM 1950 provides direction to the responsible official to "Provide for monitoring to assure that decisions are carried out in important cases, and make sure mitigation measures are implemented (40 CFR 1505.3) Monitoring of the implementation of the decision including implementation of mitigation measures would occur consistent with standard Forest implementation monitoring practices in addition to future public reviews of the project.*

*Currently long term study of California spotted owl in the area is conducted by the Eldorado Demographic Study. We expect that the ELD demographic study will continue monitoring of CSO territory occupancy in the project area following implementation of the Blacksmith project. Information from the ELD demographic study, in combination with other study results, will help refine our understanding of CSO response to vegetation management.*

**SFL-3)** Range-wide wildlife population declines are a biodiversity impact of the same scale as increasing fire effects, vegetation shifts due to lack of disturbance, and other trends that deserve specific attention.

It is hard to imagine not concluding that more aggressive actions won't lead to a trend toward federal listing when the trend is clearly established on this exact landscape.

It is some consolation that the fire effects analysis described in the DEIS p.79 suggests that the fuels treatment effectiveness and fire behavior outcomes are similar between Alt. 1 (proposed action) and Alt. 4 (Reduced Owl Impacts).

***Response:*** *Direction to maintain the viability of Region 5 sensitive species is provided by the National Forest Management Act, the Code of Federal Regulations (219.19), the Forest Service Manual (2672), and the Eldorado National Forest Land and Resource Management Plan (LRMP). The Sierra Nevada Forest Plan Amendment (SNFPA - USDA Forest Service 2004) amends the Eldorado National Forest LRMP. Findings associated with this project are limited to viability within the Forest Planning area. The project analysis has resulted in the finding that the preferred alternative will not result in a loss of viability for the CSO within the Forest Planning Area.*

**SSR-1)** Based on the information provided, the Shingle Springs Band of Miwok Indians is not aware of any known cultural resources on this site. However, SSR would like to have continued consultation through updates, as the project progresses. This will foster greater communication between the Tribe and your agency.

***Response:*** *The Eldorado National Forest appreciates the consultation the Shingle Spring Band of Miwok Indians has provided and will continue to consult with the Tribe as this project progresses.*

**SSR-2)** SSR would also like to request any and all completed record searches and or surveys that were done in or around the project area up to and including environmental, archaeological and cultural reports.

***Response:*** *Requested information is provided consistent with 36 CFR 800.2(c)(2).*

**SSR-3)** If during the progress of the project new information or human remains are found, we would like to be able to go over our process with you that we currently have in place to protect such important and sacred artifacts (especially near rivers and streams). *Specific contact provided in comments.*

***Response:*** *Requested information would be provided consistent with 36 CFR 800.2(c)(2).*

**EPA-1)** The EPA acknowledges the importance of the Blacksmith Ecological Restoration Project's goals to improve forest health and decrease fuels. We support the use of prescribed underburning as an important measure necessary to reduce the risk of fire, promote biodiversity, and restore natural ecological processes within the forest.

The EPA commends the Forest Service for limiting operations in spotted owl habitat, which will avoid direct adverse impacts to the species. We support the best management practices and resource protection measures included in the project design. For These reasons we have rated the DEIS and Preferred Alternative 4 as Lack of Objections – LO.

***Response:*** *Thank you for your support of proposed activities and project design.*

**DA-1)** I remember several years ago when the forest service proposed timber sales. Now, it's impossible to find a proposed project referred to as a "timber sale." What year did the forest service officially replace "timber sale" with "restoration project"?

***Response:*** *The Blacksmith project is designed using multiple activities to move the project landscape from the current condition to a more resilient and sustainable condition. Sale of forest products (commercial timber) using stewardship authorities to fund other proposed activities is one of the tools proposed to achieve project goals and objectives in the project area; however delivery of forest products it is not the purpose of this project. Ecological restoration is described in the leadership intent for Region 5 at [http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5351674.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5351674.pdf).*

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*Many of the management concepts discussed in An Ecosystem Strategy for Sierran Mixed-Conifer Forests (North et al. 2009), published as GTR 220 and An Ecosystem Management Strategy for Sierran Mixed-Conifer Forests published as GTR 237, are incorporated into the Blacksmith project silvicultural prescriptions. For example, topography (including slope position, aspect, and slope steepness), potential fire behavior, and fire return interval informed the initial selection of treatment areas. Within these treatment areas, groups of trees would be separated by their canopy strata and thinning, removing, or retaining them according to characteristics such as growing space and ladder fuels to improve forest vertical and horizontal heterogeneity at the stand level. Improved forest heterogeneity would benefit habitat quality and landscape connectivity. Hardwoods would be released to further promote stand diversity. In addition, mechanical treatments are planned be followed by prescribed burning to facilitate the reintroduction of the natural ecological process.*

**DA-2)** You have chosen to ignore the certain adverse spotted owl effects as described by your wildlife biologists. Alternative 1 would affect spotted owl territories as shown by the DEIS at pages 119 to 121. (*quotes of specific effects analyzed in the EIS were included in comments*). The USFWL has lost some recent court cases because they failed to write factual and accurate biological opinions. This will be the case here if you hang your hat on their opinion.

***Response:*** *The commenter restated portions of the effects section for California spotted owl indicating negative effects to California spotted owl from the Proposed Action Alternative. No additional impacts to spotted owl were identified by the commmenter.*

*Direction from 1909.15 states that "for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative". Disclosure of impacts to the California spotted owl is consistent with NEPA requirement.*

*The BE/BA for the Blacksmith project fully discloses and analyzes risk and benefits to the spotted owl from the project alternatives. There are a range of effects to the spotted owl associated with the range of alternatives, and this information will be considered by the decision maker as described in the Record of Decision. .*

**DA-3)** The timber sale will destroy wildlife habitat and directly kill individuals. This includes spotted owls. Specifically describe how the forest plan standard or BMP will eliminate ALL mortality.

***Response:*** *Direction from 1909.15 states that "for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative". Disclosure of impacts to wildlife in the Terrestrial and Aquatic BE/BAs is consistent with NEPA requirement. The potential for negative impacts to wildlife habitat and the risk of mortality to individuals is discussed and disclosed in the reports and is summarized in Chapter 3 of the DEIS.*

**DA-4)** Even seasonal employees understand that trashing resources important to Native Americans is a special case: "Project treatments under Alternatives 1, 3, 4, and 5 could result in a direct effect on plant species important to Native American gatherers." (DEIS at page 167)

***Response:*** *Consultation with tribes following 36 CFR 800.2 (c)(2) and the procedures and guidelines established in FSM 2360 and FSH 2309.12 were conducted in order to determine if any gathering sites could potentially be impacted through project activities. No sites were identified, however the presence of plant species associated with traditional native gathering were identified to be located throughout the project area.*

*Direction from 1909.15 states that "for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative". Disclosure of potential impacts to plants important to Native American gatherers is consistent with NEPA requirement, however no known gathering sites would be impacted consistent with policy direction from FSM 1560.*

**DA-5)** The citizens of Placerville already object to your proposed commercial timber sale in their backyard.

***Response:*** *CEQ regulations direct the Forest Service to "(b) Provide public notice of NEPA-related hearings, public meetings, and the availability of environmental documents so as to inform those persons and agencies who may be interested or affected (1) In all cases the agency shall mail notice to those who have requested it on an individual action…(d) Solicit appropriate information from the public. (40 CFR 1506.6)" Scoping was conducted in accordance with CEQ regulations and comments were reviewed according to FSH 1909.15 to identify issues, identify non-issues and to develop alternatives.*

*A 45 day opportunity to comment was also provided in accordance with 36 CFR 218. Responses to comments are available in the FEIS.*

**DA-6)** Request for final NEPA document modifications: Delete all cutting units and roads that may or could adversely affect the spotted owl. Also delete all cutting units and roads that may or could adversely affect the plant species important to Native American gatherers.

***Response:*** *The EIS shall document the examination of reasonable alternatives to the proposed action. An alternative should meet the purpose and need and address one or more significant issues related to the proposed action. Since an alternative may be developed to address more than one significant issue, no specific number of alternatives is required or prescribed. (36 CFR 220.5(e)).*

*An alternative to remove from treatment harvest units that would negatively impact the California spotted owl and/or plant species important to native gatherers was developed but was not found to be substantially different from the no action alternative.*

**DA-7)** It's unprofessional and illegal to omit an effects analysis from Chapter 3 because the proposed project will cause significant adverse effects to the resource that should have been examined. There is no recreation effects analysis in Chapter 3. Request for analysis and disclosure of effects in the final EIS. Please add a detailed section the EIS showing how recreation will decrease in and near the sale area.

***Response:*** *Potential impacts to recreation in the area were not identified as an issue during project development or public scoping. Recreation specialists were represented on ID team during initial project planning and no concerns or issues were raised based on potential impacts to recreation other than ensuring trails were not damaged during activities. Design criteria to protect recreation trails are part of the project proposal.*

*Based on Draft EIS comments an analysis of impacts to recreation has been included in the final EIS. Any impacts to recreation are expected to be short term and are not expected to be significant.*

**DA-8)** Most American recreationists will avoid areas that have been logged. You propose action that will reduce the revenue for businesses in local communities that rely on recreation dollars: motels, sporting goods stores, restaurants, gas stations, grocery stores etc.

U.S. Undersecretary of Agriculture Jim Lyons states that recreation revenues from national forests significantly exceed timber revenues. See;
http://www.americantrails.org/resources/economics/EconForestRec.html

There are more businesses in communities near Georgetown and Placerville that depend on recreation revenues than there are businesses that depend on timber revenues.

See Attachment #1.

***Response:*** *The Eldorado Forest Land and Resource Management Plan provides direction to maintain a range of recreation experiences since existing classes vary between Management Areas and to keep the Recreational Opportunity Spectrum levels at the approved class in the Recreation Opportunity Spectrum Inventory.*

*Citations in Attachment 1 were reviewed and analyzed based on comments provided. Attachment #1 has two comments specific to recreation and several that address multiple use including recreation. Comments based on citations in attachment 1 are addressed below.*

*Though developed and undeveloped recreation activities on the Eldorado National Forest are varied and abundant, recreation use specifically within the project area is largely limited to dispersed camping, fishing, hiking and hunting. The Blacksmith project area contains few unique opportunities for recreation and receives most use during the spring thru fall seasons. Because the project area is intermixed with*

*private land managed for timber production and National Forest lands managed for multiple uses, which have included implementation of recent thinning projects, the proposed project is not expected to measurably impact recreational use of the area or revenue generated from recreational use of the area. The majority of recreation use in the Georgetown area is motorcycle traffic connecting between Wentworth Springs and Icehouse Roads, four-wheel drive vehicles traveling to the Rubicon Trail, hunters, and traffic to fish and camp at local reservoirs. In recent years over 200 log trucks a day travel through the project vicinity. Approximately 10% of this traffic is from National Forest lands. This project would not measurable be expected to change that ratio.*

*This project is not expected to negatively impact the local businesses by reducing opportunities for recreational experiences on the Forest through proposed treatments in the project area as discussed in the Recreation analysis for this project. Furthermore this project is expected to beneficially impact the economy through wages provided to woods workers and local processing facilities as discussed in the economic analysis for the project.*

**DA-9)** The Blacksmith timber sale is inconsistent with best science. The USFS is mandated by law to base their projects on best science. Attachments to comments included. The attachments contain just a tiny sample of the available literature describing the tragic effects of logging to properly functioning natural resources. Competent, professional IDT members recognize that line-officers in search of timber sales invent problems and ignore the fact that in most cases doing nothing is the best course of action.

***Response:*** *The commenter indicates that doing nothing is a better course of action in most cases. A no action alternative is required in an EIS (40 CFR 1502.14(c)). Analysis of the no action alternative is completed in the individual resource specialist reports for the project and is summarized in the EIS.*

*Many of the management concepts discussed in An Ecosystem Strategy for Sierran Mixed-Conifer Forests (North et al. 2009), published as GTR 220 and An Ecosystem Management Strategy for Sierran Mixed-Conifer Forests published as GTR 237, are incorporated into the Blacksmith project silvicultural prescriptions. For example, topography (including slope position, aspect, and slope steepness), potential fire behavior, and fire return interval informed the initial selection of treatment areas. Within these treatment areas, groups of trees were separated by their canopy strata and thinning, removing, or retaining them according to characteristics such as growing space and ladder fuels to improve forest vertical and horizontal heterogeneity at the stand level. Improved forest heterogeneity would benefit habitat quality and landscape connectivity. Hardwoods would be released to further promote stand diversity. In addition, mechanical treatments are planned to be followed by prescribed burning to facilitate the reintroduction of the natural ecological process.*

*Furthermore, collaboration with the research community, environmental organizations, industry and other interested groups were used to inform the project design and to develop alternatives.*

**DA-10)** The Attachments contain the statement by over 600 well respected Ph.D. scientists who describe the damage to the forest ecosystem caused by logging and road construction activities. Why do you reject best science and instead act on the advice of 4 to 5 of your timber employees who will benefit financially if the Blacksmith timber sale is offered and sold? Please review this project in light of the best science attached to the objector's comments and acknowledge the science conclusions of 421 independent, unbiased scientists regarding the impacts of timber sale activities. The scientists quoted in each attachment describe how natural resources are harmed by logging. Please assure that literature written by USDA employees does not dominate the References section of the final NEPA document. Add at least as many source documents for the quotes in the attachments as there is literature written by USDA employees. Please see Attachment #15.

***Response:*** *The commenter has submitted information with potentially opposing scientific views from those used to develop and analyze the project. This information is reviewed and analyzed where it is referenced. Additionally the commenter asserts that Forest Service timber employees are benefitting financially from the offer and sale of the Blacksmith project.*

*Regulations from the Council on Environmental Quality (CEQ) direct agencies to "insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements" (Section 1502.24).*

*We agree that best available science should be used to design and evaluate Forest Service actions. The best available science was used to design the project activities and to evaluate the positive and negative effects of project actions on individual resources. Every action including no action has an effect on Forest resources. The purpose of the Blacksmith EIS is to display and document those effects to inform a decision. In addition to literature cited in the DEIS, there are references in specialist reports and documents incorporated by reference. Opposing scientific opinions have been acknowledged and evaluated where presented.*

*Citations in Attachment 15 were reviewed and analyzed based on comments provided. Attachment 15 contains 17 individual quotes from Forest Service leadership directing and emphasizing the importance of using the best available science and detailing the Forest Service efforts to do that. The last 3 citations are in relation to findings of a scientific symposium and two specific projects and are not relevant to the use of best available science in this project.*

*Ethical conduct of employees regarding personal financial interests are regulated through: gifts from outside sources (subpart b - 5 CFR 2635.201-205), conflicting financial interests (subpart d - 5 CFR 2635.401-403), and impartiality in performing official duties (subpart e - 5 CFR 2635.501-503. The purpose and need for the project is described in the EIS for the project. Employees financially benefiting from the sale of Forest Service products would be a violation of ethics codes and regulations..*

**DA-11)** Responses to public comments should be posted online as well as hardcopy in the Project File.

***Response:*** *All substantive comments received on the draft statement (or summaries thereof where the response has been exceptionally voluminous), should be attached to the final statement whether or not the comment is thought to merit individual discussion by the agency in the text of the statement. (40 CFR 1503.4)*

*The response to comments is included in the EIS as an appendix.*

**DA-12)** The DEIS does not analyze an alternative in detail that does not construct any new roads (temp or system). The Responsible Official could analyze an infinite number of alternatives by simply adjusting the acres harvested up or down. If adjusted upwards, the harvest goals will be achieved sooner. If adjusted down, it will take longer to achieve the harvest goals. The no new roads alternative stands out among the infinite number of alternatives because it reduces the adverse environmental effects of the proposed action while still meeting the purpose and need for the project. Please analyze an alternative in detail that does not construct any new roads (temp or system).

New road construction is an activity that causes damage to some important natural resources in the sale area. This activity is particularly detrimental to aquatic and wildlife resources. Chief Dombeck's statement below supports this fact.

"Roads often cause serious ecological impacts. There are few more irreparable marks we can leave on the land than to build a road."

Dr. Mike Dombeck, Chief, US Forest Service
Remarks to Forest Service employees and retirees at the University of Montana
February 1998

***Response***: *Direction from CEQ is to "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act." (40 CFR 1501.2(c))*

*Reasonable alternatives to the proposed action should fulfill the purpose and need and address unresolved conflicts related to the proposed action. Be alert for alternatives suggested by participants in scoping and public involvement activities. Consider alternatives, even if outside the jurisdiction of the Agency (FSH 1909.15).*

*Alternative 3 has been modified to exclude all road construction.*

**DA-13) Roads cause irreparable damage. S**ee Attachment #4. Dr. Bunnell concludes from his research on logging roads that: "Sediment input to freshwater is due to either the slower, large-scale process of soil erosion, or to rapid, localized "mass movements," such as landslides. Forest practices can increase the rate at which both processes occur. Most sediment from forestry arises from landslides from roads and clearcuts on steep slopes, stream bank collapse after riparian harvesting, and soil erosion from logging roads and harvested areas. Roads, particularly those that are active for long periods of time, are likely the largest contributor of forestry-induced sediment (Furniss et al. 1991)."

"Sediment can increase even when roads comprise just 3% of a basin (Cederholm et al. 1981)."

"More than half the species present in the study area will likely be negatively impacted by sedimentation from logging roads." Source: http://warehouse.pfc.forestry.ca/pfc/25154.pdf

***Response:*** *Forest Service policy is that for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative (FSH 1909.15).*

*Citations in Attachment 4 were reviewed and analyzed based on comments provided.*

*We agree that roads can negatively impact forest resources including wildlife, aquatic systems, water quality, and may increase invasive species colonization. Effects from proposed road work are analyzed in the individual specialist reports for the project. Proposed construction is not aimed at accessing large areas of unroaded forest for timber harvest, but is rather proposed to construct short segments that would access previously logged areas that are strategic locations and where old roads or past logging practices are expected to result in increased negative impacts to forest resources.*

*In the early- to mid -20th century road construction activities focused construction on ridge-tops, and in riparian areas and on adjacent hillsides. The roads efficiently provided access, but decreased the land's value for wildlife habitat and resulted in constricted stream channels, which provided a new avenue for erosion and discharge of sediment into streams. Roads on National Forest lands were often an expansion of existing trails and paths. Roads were constructed so that they would accommodate newer equipment and changing land uses. In some situations, roads were located on abandoned railroad beds. In many cases, the location and design were predetermined by the use during the previous era.*

*In the decades following World War II the road network was expanded to support increased logging brought about by the domestic need for lumber in housing construction. As time progressed, these roads were "designed" and located to achieve their primary purpose, which was to provide access and remove products at the minimum cost.*

*In the past, when a road's utility ended, the road was simply abandoned. These abandoned roads have been a substantial water quality and slope stability issue as they have deteriorated, especially without maintenance. Abandoned roads within the project area that are producing undesirable amounts of sediment would be improved through this project.*

*The road construction and reconstruction of roads with this project would include application of site-specific standards and guidelines for resource protection as described in the Eldorado National Forest Land and Resource Management Plan (LRMP) and Best Management Practices (BMPs) Forest Service BMPs currently incorporated into road construction and reconstruction activities on the Eldorado National Forest include:*

- *Road surfacing (road rocking, chip sealing, etc..) is oftentimes included in reconstruction activities to not only provide better traffic usage; but also to prevent and control erosion from the road surface*
- *Road drainage controls are being incorporated into designs that are intended to:*
    - *Reduce the erosive flows in ditches by providing frequent cross-drains to relieve ditch flows;*
    - *Avoid water movement down the road by dispersing the drainage quickly by crowning or outsloping the road surface;*
    - *Disperse drainage water (that often carries sediment) onto stable forested slopes before ditches discharge into waterways;*
    - *Ensure new and existing stream crossings safely pass extreme events when constructed or reconstructed (i.e. 100-year flood event).*

*Special construction techniques are utilized (i.e., full-or partial-benching of roads) to avoid unstable side casting of waste materials. Many new roads now are designed to take advantage of the non-uniformities of the slopes they cross by using "rolling grades" and grade breaks to prevent the potential for accumulations of water or excess ditch flows that otherwise would have destabilized the road bed or caused surface erosion.*

*Designers and planners develop road networks that avoid highly erosive or unstable slopes utilizing the land systems inventory, and the knowledge and experience of hydrologists, soil scientists, and geotechnical engineers. Road treatments include the elimination of ruts, repair of ditches, repair or installation of dips and waterbars, and the replacement of non-functional or undersized culverts.*

*Road/creek crossings are located at more stable sites and crossings designs consider water quality as a primary design criteria rather than criteria that primarily are directed at cost and traffic efficiency. Roads are being located well away from streams and their riparian areas wherever practical; and the number of crossing sites is minimized. These efforts are in stark contrast to some past road locations that sometimes resulted in chronic sources of sediments.*

*Additionally, Riparian Conservation Objectives that maintain or enhance Riparian Conservation Areas within the project area have been developed by members of the interdisciplinary team from Hydrology, Aquatic Biology, soils and Botany. Current practice is to restore key abandoned or no longer useful roads to a "hydrologically neutral" condition. Effects of road construction, reconstruction, and*

*decommissioning are discussed and disclosed in individual specialist reports for the project and are summarized in Chapter 3 of the EIS.*

**DA-14)** In the final EIS please tell the public why such natural resource damage will not occur on the Blacksmith timber sale, or if it will occur, explain why the resource damage is an acceptable tradeoff for volume.

***Response:*** *Forest Service policy is that for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative (FSH 1909.15 Chapter 10). Individual resource reports for the project document the potential resource damage that is likely to occur because of proposed activities for each of the action alternatives and in the absence of action in the analysis of the no action alternative. These reports are summarized in Chapter 3 of the EIS.*

**DA-15)** There is only 1 place in the national forest where action should be taken to improve vegetative resilience to disturbance agents such as insects, disease, and fire: close to the WUI. It's very important that natural disturbance events be allowed to occur in the forest if the events do not occur close to the WUI where the risk of fire severity might be increased which would put homes at risk.

***Response****: The 2004 Sierra Nevada Forest Plan Amendment provides direction for treatment of land allocations. Goals for fire and fuels management include reducing threats to communities and wildlife habitat from large, severe wildfires and re-introducing fire into fire-adapted ecosystems. The Forest Plan decision includes managing hazardous fuels in and around communities combined with strategic placement of fuels treatments across broad landscapes to modify wildland fire behavior. The desired conditions for the project area and the need for treatment to move landscapes toward that condition were based upon direction in the Forest Plan. The loss of late seral habitat to high intensity wildfire in sensitive species habitat along with the ability of the Forest Service to meet other multiple use management goals including providing clean water is a concern detailed in the purpose and need for the project. For all land allocations proposed for treatment in this project the Forest Plan provides direction to establish and maintain a pattern of fuels treatments that is effective in modifying wildfire behavior on the landscape (SNFPA ROD pp. 45-48). Activities proposed in the project are consistent with direction from the Forest Plan .*

**DA-16)** Many natural resources not only benefit from tree mortality caused by natural disturbance events, but depend on these natural disturbance events. The forest is infinitely more than conifer trees. A properly functioning forest is dependent on decadent, dying, unhealthy trees. A healthy, natural forest has an abundance of dead trees. All healthy groups have unhealthy and dying individuals. Removing certain trees from the forest to increase vigor and diameter growth harms the biodiversity of the area. Taking action to increase vigor and diameter growth is the goal of private industrial tree farm managers … not national forest managers. Please see Attachments #5, #8 and #14.

Request for final NEPA document modifications: Please remove the all wording that action needs to be taken to reduce or eliminate the occurrence of natural disturbance events that occur outside the WUI influence zone.

***Response****: Citations from attachments were reviewed based on comments provided. Citations in comments 5 and 14 are responded to below. Attachment 8 discusses the beneficial aspects of fire and relates to actions to modify the landscape after a wildfire. This project is not a proposal to modify a landscape after a wildfire, therefore citations provided in Attachment 8 are not relevant to this proposal. We agree that fire can be beneficial to the ecosystem and therefore re-introduction of fire into stands is identified as a part of the purpose and need for the project. However not all fire effects are beneficial.*

*The loss of limited late seral habitat to high intensity wildfire along with the ability of the Forest Service to meet other multiple use management goals including providing clean water is a concern detailed in the purpose and need for the project.*

*The 2004 Sierra Nevada Forest Plan Amendment provides direction for treatment of land allocations. The desired conditions for the project area and the need for treatment to move landscapes toward that condition were based upon direction in the Forest Plan. Activities proposed with this project are designed to move stands toward those desired conditions.*

**DA-17)** Noise and Dust caused by Timber Harvest Adversely Affects Recreation, thus the Adverse Social and Environmental Impacts must be Analyzed in Chapter 3 with follow-up changes made to the timber sale design to eliminate these effects. Sadly, the DEIS fails to mention the impacts to recreation of noise and dust resulting from logging activities. The noise is clearly evident and disruptive several miles away from the source. Please assure the impacts to the potentially affected resource are estimated in the final EIS and mitigation is includes in the decision document to eliminate the problem.

***Response**: Based on Draft EIS comments an analysis of impacts to recreation has been included in the final EIS. Any impacts to recreation are expected to be short term and are not expected to be significant.*

*Noise from machinery use associated with the project activities would be limited in duration and area. No developed recreation facilities or residencies are within proximity to project units, therefore limitations on noise production are not deemed necessary for this project. Impacts from noise are not expected to significantly affect recreation use of the area.*

*Dust from thinning and fuels reduction activities is expected to be limited to the location of machinery operation. It is not expected that recreationist would be using the area of active operations. Road use and operations in this project is guided by National BMPs Roads 3 - Road Construction and Reconstruction and Road – 4. Road Operation and Maintenance and Regional BMP 12.22 2.3 Road Construction and Reconstruction and 2-4 Road Maintenance and Operations. Dust abatement for roads used during the project is a standard operating procedure covered under the timber sale contract and described in the Eldorado National Forest Standard Timber Sale Road Maintenance Specifications for Roads.*

> *"Water applications shall be limited to abatement for hauling vehicles under this contract and shall be provided at a frequency and rate which controls dust such that vehicle tail lights and turn signals remain visible. Rates of application shall be varied as needed but shall be low enough to avoid forming rivulets. Frequency of application shall be sufficient to accomplish the abatement without saturating and softening the traveled way. Compacted or glazed road surface or wheel tracks may be loosened as needed for water penetration."*

**DA-18)** Please assure the final EIS describes how the Responsible Official has complied with the requirements of USC TITLE 42 --THE PUBLIC HEALTH AND WELFARE, CHAPTER 65--NOISE CONTROL, Sec. 4905. Noise emission. Remember, anyone responsible for protecting the land owned and loved by 307 million Americans as you are Supervisor Crabtree must understand that their job under NEPA entails more than simply describing how their proposed project will harm the recreational experiences and natural resources in the forest. They must modify (or drop) their proposed project so the chances of damage and harm no longer exist. Clearly, the public believes their recreation and natural resources in national forests must never be considered acceptable collateral damage of timber volume accumulation. This includes industrial noise and dust degradation. Please disclose that noise and dust may adversely affect recreation experience of human visitors to the forest and some wildlife species that exist near the project area and analyze the effects

that may occur to 1) recreation, and 2) vulnerable wildlife species in Chapter 3, and explain why such impacts are a justified tradeoff for the stated project benefits.

***Response**: USC Title 42 Chapter 65 is aimed at regulating noise emissions for products sold in commerce. Industrial noise is not a part of this project proposal.*

*The potential for effects of project activities, including noise on Threatened, Endangered, and Sensitive wildlife species is analyzed in the project BA/BE and is summarized in Chapter 3 of the EIS. While there may be localized impacts in treatment units during project activities, active project units are not expected to be used for recreational activities during operations. Only a portion of project units would be impacted at any one time, and other areas would remain available to provide similar recreation use during project implementation. Therefore significant impacts on recreation are not expected. Effects of noise on recreation are analyzed in the recreation report for the project and are summarized in Chapter 3 of the EIS.*

**DA-19)** Herbicides Containing Glyphosate must never be used on public land for any reason. As a retired USFS employee I understand the potential damage to natural vegetation that will occur if non-native invasive plants are not eradicated. I also know there are effective (although a little more costly) alternatives to killing these plants other than applying the lethal herbicides that contain glyphosate.

Request for final NEPA document modifications: Please treat non-native plants with alternatives to glyphosate-containing herbicides and assure the public that glyphosate will not be applied with a statement in the ROD.

***Response**: FSM 2150 provides direction on use of pesticides by the Forest Service.*

*"2150.1 - Authority. The Forest Service is authorized by the Federal Insecticide, Fungicide, and Rodenticide Act and the Cooperative Forestry Assistance Act to use pesticides for multiple-use resource management and maintenance of the quality of the environment as long as the actions comply with the National Environmental Policy Act and the Council on Environmental Quality regulations."*

*Design features included in the project state that occurrences of high priority invasive plant species within or in proximity to project activities would be treated by hand pulling, burning with blow torch, or with herbicide treatment prior to other project activities to reduce potential for new occurrences or spread of existing occurrence, except where otherwise noted. Where possible the project will employee non-chemical control measures to remove invasive species but there are a number of species known in the project area that cannot be effectively controlled by non-chemical treatments, like tree of heaven and rush skeletonweed, which readily resprout when treated mechanically. Other species in the project are well established and cannot be reasonably treated using non-chemical control given the extent of current infestations.*

*Alternative 3 has been modified to have no herbicide use associated with project activities. Analysis of this alternative is included in the EIS and related specialist reports.*

**DA-20)** You might be aware of the Monsanto Protection Act working its way through Congress. Please put 2 and 2 together. You may not be aware the USDA Secretary Vilsack has a history of very close friendly association with pesticide corporations. Please see below:

http://www.organicconsumers.org/articles/article_15573.cfm
http://www.counterpunch.org/2008/12/18/another-shill-for-monsanto/

http://www.veganreader.com/2008/12/18/obama-blows-it-with-monsantos-vilsack-lbam-spray-victims-beware/
http://www.dirtdoctor.com/Glyphosate-Danger-to-Livestock-Plantsbr_vq3915.htm

***Response**: Acts being reviewed by Congress, allegations regarding the Secretary of Agriculture, and comments specific to Monsanto are not relevant to the project analysis.*

**DA-21)** Glyphosate kills aquatic life even if the concentrations of the chemical in water are very low. The fish deaths will occur in the streams in the project area and a few miles downstream. Herbicide mist should never be allowed to contact water … even so-called aquatic-safe herbicides. As you already know, corporations will do anything for profit, including misrepresenting the safety of a toxic chemical they manufacture.

***Response**: Direction to maintain the viability of Region 5 endangered, threatened, and sensitive species is provided by the National Forest Management Act, the Code of Federal Regulations (CFR 219.19), the Forest Service Manual, FSM 2672 (USDA Forest Service 1990), and the Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement (EIS) (USDA Forest Service 2004). The project has been designed to avoid or minimize the risk of soil, surface water and ground water contamination in accordance with National BMPs pertaining to Chemical Use (Chem-1 thru Chem-6) and Regional BMPs pertaining to pesticide (5-7 thru 5-13 described in Appendix B of the EIS).*

*The potential for glyphosate to enter waterbodies based on the proposed activities and past project monitoring of similar activities on the Eldorado National Forest are discussed in the Hydrology Report for the project.*

> *"Glyphosate tends to bind readily and strongly to soil particles, does not leach through most soil types, mostly (~90%) decomposes to its natural components within about six months, and does not bioaccumulate (SERA 1997, SERA 2003a). Monitoring results, based on over 150 surface water samples taken at locations in National Forests in California between 1991 and 2002, appear to indicate that glyphosate applied by ground application seldom reached surface water even with "no spray" buffer widths as narrow as 10 feet (Bakke 2001; Frazier and Grant 2003). The highest concentration of glyphosate measured by the US Forest Service in Region 5 since 1991 was less than 30 micrograms per liter (ug/L), while the Maximum Contaminant Level (MCL), as set by the Environmental Protection Agency, for glyphosate for human health is 700 ug/L. In addition, approximately 99 percent of the stream samples tested had concentrations less than the laboratory detection limit. The Minimum Detection Limit for glyphosate is 1 to 25 ug/L. The few instances where glyphosate has been detected in surface water have almost always been traced to accidental spills directly into a stream, the intentional spraying of the stream surface, or the spraying of vegetation on the streambank or on gravel bars in the channel (Bakke 2001). Additionally, herbicide monitoring for glyphosate in surface water performed on the Eldorado National Forest between 1993 and 2007, showed no detection of glyphosate in any of 29 samples (Markman 2008).*

*Although there is a risk for negative effects to aquatic wildlife from proposed herbicide activities, effects are expected to be limited in scope and duration. Effects from proposed herbicide application are not expected to be significant. Risk and analysis of effects to Threatened, Endangered, and Sensitive aquatic wildlife from proposed herbicide application is included in the Aquatic Wildlife BE/BA for the project, and is summarized in Chapter 3 of the EIS.*

**DA-22)** Glyphosate is persistent and remains active for several days after being applied.

***Response:*** *Forest Service Policy in FHS 2109.14 directs development of a risk assessment during pesticide use planning. A project specific pesticide risk assessment has been developed using information in the 2011 Glyphosate Human Health and Ecological Risk Assessment completed for the Forest Service by Syracuse Environmental Research Associates, Inc. This analysis includes scenarios that involve persistence of glyphosate on vegetation and in the soil. The Risk Assessment for glyphosate developed by SERA (2011) discusses the persistence of glyphosate. Based on information from studies synthesized in SERA (2011) the foliar half-life of glyphosate has been shown to range from 2.5 to 26.6 days and the soil half-life has been shown to range from 2.6 to 180 days depending on conditions and soil type. Project design criteria were developed based on potential risks that were identified in that assessment. Risks of glyphosate to human health are discussed in the Risk Assessment for the Blacksmith Project. Expected effects of glyphosate are discussed in the individual specialist reports for the project and are summarized for each resource in Chapter 3 of the EIS.*

**DA-23)** Literature authored by independent scientists not connected with Monsanto or the USFS indicates mammals that eat contaminated foliage and humans that might brush against contaminated foliage or eat contaminated berries have been known to suffer from the following as a result of glyphosate contact: birth defects, non-Hodgkin's lymphoma, mitochondrial damage, cell asphyxia, miscarriages, attention deficit disorder endocrine disruption, DNA damage, skin tumors, thyroid damage, hairy cell leukemia, Parkinson disease, premature births, decrease in the sperm count, harm to the immune system in fish death of liver cells, severe reproductive system disruptions and chromosomal damage.

***Response:*** *Specific literature is discussed where provided. Forest Service Policy in FHS 2109.14 directs development of a risk assessment during pesticide use planning. Risk to humans using exposure scenarios is discussed in the Risk Assessment for the Blacksmith Project This analysis includes hazard identification, exposure assessment and risk characterization. This information was used to design the project to minimize risk from pesticide application.*

*Direction to maintain the viability of Region 5 endangered, threatened, and sensitive species is provided by the National Forest Management Act, the Code of Federal Regulations (CFR 219.19), the Forest Service Manual, FSM 2672 (USDA Forest Service 1990), and the Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement (EIS) (USDA Forest Service 2004). Risk to mammals relative to this direction is discussed in the Terrestrial Wildlife BE/BA for the project and is summarized in the Chapter 3 of the EIS.*

*Furthermore, studies indicating adverse effects to human health and safety and to mammals are discussed in SERA (2011) incorporated in the project analysis by reference.*

**DA-24)** Would you apply a chemical to your yard where children play in the grass that was banned in Denmark 10 years ago because of its lethal effects? See http://www.twnside.org.sg/title/service76.htm

Would you apply a chemical to your yard where children play in the grass that the Institute of Science in Society based in London England calls for banning in England? See: http://www.i-sis.org.uk/about.php and http://www.i-sis.org.uk/Ban_Glyphosate_Herbicides_Now.php

***Response:*** *Use of pesticide in the project area is governed by laws and policies of the United States of America and the State of California. Appropriate laws and regulations would be followed during project implementation.*

*FSM 2150 section 2150.1 describes the authority for pesticide use on National Forest System lands.*

*"Authority. The Forest Service is authorized by the Federal Insecticide, Fungicide, and Rodenticide Act and the Cooperative Forestry Assistance Act to use pesticides for multiple-use resource management and maintenance of the quality of the environment as long as the actions comply with the National Environmental Policy Act and the Council on Environmental Quality regulations."*

*The project specific risk assessment characterizes risk to the general public, including scenarios involving children to identify risks associated with the project to inform the decision, and to identify where design criteria may be warranted to minimize risk.*

**DA-25)** The following links provide additional scientific proof that glyphosate-containing herbicides are likely to cause bee Colony collapse disorder (CCD) that's currently driving bees extinct. Please disclose this information in Chapter 3 of the final EIS and if available provide scientific information showing why this is untrue (*several website links provided in the comment submitted by the commenter).*

Are you still unsure about Monsanto's glyphosate safety? Please read this article in the April 2013 issue of Entropy magazine: http://www.mdpi.com/1099-4300/15/4/1416

***Response:*** *Direction to maintain the viability of Region 5 endangered, threatened, and sensitive species is provided by the National Forest Management Act, the Code of Federal Regulations (CFR 219.19), the Forest Service Manual, FSM 2672 (USDA Forest Service 1990), and the Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement (EIS) (USDA Forest Service 2004).*

*Forest Service Policy in FHS 2109.14 directs development of a risk assessment during pesticide use planning. The Risk Assessment for the Blacksmith Project includes a hazard identification, exposure assessment and risk characterization. Risk characterization for terrestrial invertebrates, such as the honeybee, associated with the use of glyphosate are described in the Biological Evaluation, Appendix B.*

*Western bumble bee has been identified as a Region 5 Sensitive Species. Effects from proposed herbicide to the Western honeybee are analyzed in the terrestrial wildlife BE/BA for the project and are summarized in Chapter 3 of the EIS.*

**DA-26)** Your discussion of the safety of glyphosate is a joke. The Dana Walsh paper written in 2013 is cited in the DEIS at page 176 as the basis for the glyphosate safety concerns. The paper is detailed in the bibliography:

Walsh, Dana. 2013. Site Specific Human Health and Risk Assessment for the Blacksmith Ecological Restoration Project. Georgetown Ranger District. Eldorado National Forest. Georgetown, CA.

Based on the Walsh paper the DEIS at page 176 describes the safety of glyphosate as proposed to be used in the Proposed Action alternative: "For general public no exposure scenario approached a level of concern for the proposed application rate. Safety precautions built into the design criteria have been designed to further minimize potential risks."

The Walsh paper was clearly written in 2013 to justify the use of glyphosate-containing herbicides for the 2013 DEIS for the Blacksmith timber sale. Do you really expect the public to believe a herbicide safety paper written by a forester with financial interest in selling the sale with no background in chemical safety? Do you expect the public to believe the Walsh paper when Attachment #9a contains statements of over 100 Ph.D. chemists who emphasize the extreme toxicity of herbicides containing glyphosate?

Most intelligent people would not accept information dealing with a chemical life and death issue based on a paper written by a forester. Given the clear scientific evidence showing glyphosate causes cancer with casual exposure, would you allow your young children or grandchildren to play in a yard that had been treated with a glyphosate-containing herbicide? This is not a rhetorical question.

Please see Attachments #9a and #18.

***Response:*** *The direction for analysis is that for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative in accordance with FSH1909.15. FSH 2109.14 details the components of a risk analysis and states that:*

> *"These analyses are usually incorporated into the decision making documents prepared in compliance with the National Environmental Policy Act (FSM 1950). A pesticide risk assessment does not, in itself, ensure safety in pesticide use. The analysis must be tied to an action plan which provides mitigation measures to avoid potential risks identified by the risk assessment) FSM 2109.14.*

*The project specific risk assessment tiers to the Glyphosate Human Health and Ecological Risk Assessment – Final Report developed by Syracuse Environmental Research Associates Inc., and using worksheets developed to identify where there is a higher potential for concerns for pesticide use to affect human health and safety reports the information for analysis and decision making. The project analysis meets direction. The analysis for this project meets the direction in FS1909.15.*

*Ethical conduct of employees regarding personal financial interests are regulated through: gifts from outside sources (subpart b - 5 CFR 2635.201-205), conflicting financial interests (subpart d - 5 CFR 2635.401-403), and impartiality in performing official duties (subpart e - 5 CFR 2635.501-503. The purpose and need for the project is described in the EIS for the project. Employees financially benefiting from the sale of Forest Service products would be a violation of ethics codes and regulations.*

*Citations in Attachments 9a and 18 were reviewed and analyzed based on comments provided.*

**DA-27)** The DEIS for the Blacksmith timber sale does not "identify methods and procedures required by section 102(2)(B) to "Identify methods and procedures required by section 102(2 )(B) to insure that presently unquantified environmental amenities and values may be given appropriate consideration." Simply stating that amenity resource values have been considered in the NEPA document is not enough. The Responsible Official must "identify the methods and procedures used to assure appropriate consideration." Please identify and discuss the methods and procedures used by the Responsible Official to insure that presently unquantified environmental amenities and values are given appropriate consideration.

***Response:*** *42 USC §4332 sec. 102 (B) requires agencies to "identify and develop methods and procedures, in consultation with the Council on Environmental Quality established by title II of this Act, which will insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision making along with economic and technical considerations;".*

*In relation to 40 CFR 1502.23 the act states that:*

> *"For purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations. In any event, an environmental impact*

*statement should at least indicate those considerations, including factors not related to environmental quality, which are likely to be relevant and important to a decision."*

*Much of the management of forest resources relates to values that are unquantified. Measurement indicators for individual forest resources are used to describe project effects and compare alternatives for the EIS. These indicators use qualitative and quantitative measures to discuss effects of the project on individual resource areas and to compare the potential of alternatives to meet the elements of the purpose and need.*

**DA-28)** The DEIS does not discuss the items shown below that are required by 40 CFR 1502.16 shown below

**(e) En**ergy requirements and conservation potential of various alternatives and mitigation measures.

(f) Natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures.

(g) Urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures.

Please comply with the law by including the missing information.

***Response:*** *FSM 1950 provides direction for the Responsible Official to "ensure that the effects analysis address all legal and regulatory requirements and ensure that the levels of accuracy and precision are consistent with the methods and technology used (40 CFR 1502.16 and 40 CFR 1502.24). Specifically the comment addresses:*

*(e) Energy requirements and conservation potential of various alternatives and mitigation measures.*
*(f) Natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures.*
*(g) Urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures.*

*The effects analysis for individual resources analyzes the effects of alternatives and shows the tradeoffs of different actions or lack of action. Furthermore, the Blacksmith EIS addresses short-term uses and long-term productivity and irreversible and irretrievable commitments of resources.*

**DA-29)** The DEIS does not discuss how the timber sale's harvest and slash/RX burning activities will affect protected bird species or if there will be potential adverse effects how they will be eliminated.

"Migratory Birds, Executive Order 13186 of January 10, 2001
A migratory bird report was developed for the project. No negative effects to migratory birds are expected to result from project activities under any alternative (Funari 2013b)" (DEIS at page 185)

Request for final NEPA document modifications: Please identify the birds that exist in and near the project area that are protected under the Migratory Bird Treaty Act and discuss how these birds will be protected during burning and timber harvest operations. In the final EIS provide the link to:

Funari, Claudia. 2013b. Migratory Landbird Conservation on the Eldorado National Forest. Blacksmith Ecological Restoration Project. Georgetown Ranger District, Eldorado National Forest. Georgetown, CA.

***Response:*** *Under the National Forest Management Act (NFMA), the Forest Service is directed to "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives." (P.L. 94-588, Sec 6 (g) (3) (B)). The January 2000 USDA Forest Service (FS) Landbird Conservation Strategic Plan, followed by Executive Order 13186 in 2001, in addition to the Partners in Flight (PIF) specific habitat Conservation Plans for birds and the January 2004 PIF North American Landbird Conservation Plan all reference goals and objectives for integrating bird conservation into forest management and planning.*

*In late 2008, a Memorandum of Understanding between the USDA Forest Service and the US Fish and Wildlife Service to Promote the Conservation of Migratory Birds was signed. The intent of the MOU is to strengthen migratory bird conservation through enhanced collaboration and cooperation between the Forest Service and the Fish and Wildlife Service as well as other federal, state, tribal and local governments. Within the National Forests, conservation of migratory birds focuses on providing a diversity of habitat conditions at multiple spatial scales and ensuring that bird conservation is addressed when planning for land management activities.*

*Opportunities to promote conservation of migratory birds and their habitats in the project area were considered during development and design of the Blacksmith project. In particular, opportunities to enhance habitat for Birds of Conservation Concern identified by the U.S. Fish and Wildlife Service in the Sierra Nevada Bird Conservation Region (2008). This includes the flammulated owl, California spotted owl, olive-sided flycatcher, Calliope hummingbird, Lewis's woodpecker, Williamson's sapsucker, and Cassin's finch, which may utilize habitat in the project area.*

*A number of project designs features, described in the Migratory Landbird Conservation Report (Fuanri 2013) are directed towards enhancing habitat or minimizing impacts to landbirds in all action alternatives. The temporary presence of large and small piles scattered throughout the landscape will increase nesting area for ground or shrub or generalist nesting birds such as black-headed juncos and American robins. Retention of shrubs throughout mastication units, gap restoration areas within stand improvement units, archeological sites and skip areas (non- treatment areas) within treatment units will retain some habitat for ground nesters, as well as shrub nesters and early seral dependent species. Nonetheless, the report describes that reduced canopy cover and reduced shrub cover in forested stands will decrease habitat quality for many bird that rely on high canopy cover and shrub associated prey or nesting structure for the next 10-20 years. This reduction in habitat quality will most likely impact raptors that depend on late seral habitat such as spotted owls and northern goshawks. The project will not adversely impact migratory landbird species or their associated habitats for the long term, however, nor will it impact landbird species across the landscape since project activities occur at a small scale in relation to the range of these species.*

**DA-30)** If the Responsible Official is Really Concerned about Aquatic Species' Health the Final EIS MUST Indicate that All Newly Constructed Temporary Roads will be Obliterated after Use and the Responsible Official Must do it.

The DEIS indicates temporary road construction is a connected action to this timber sale.

Please obliterate all temporary roads after use and tell the public this will be done in the final EIS. An obliterated road contains no running surface, because the natural sideslope that existed before the road was constructed is reestablished. Not obliterating a road because the line-officer will use it again to haul logs from the area means the road is not temporary! Road that will be used again in the future should be constructed to system road standards, or not at all.

Since temporary roads are outsloped with no ditch, sediment that is generated during precipitation events, find its way to streams and harms the aquatic resources for decades until the next timber sale reconstructs the so-called "temporary" road. Then the riparian resource cycle of destruction begins again. The final EIS should clearly state these roads will be obliterated after use such that the sideslopes are as they were before construction. The CMPs will be removed and a running surface does not exist.

Please see Attachment #4.

***Response:*** *Direction from FSH 2405.19 is to "Remove material resulting from temporary roads and skid trails from streamcourse crossings to the extent possible. Wherever ground conditions permit, restore stream banks to original conditions by reshaping and grass seeding disturbed areas." Regional BMP 2-8 for "Stream Crossings" provides direction to minimize water, aquatic, and riparian resource disturbances and related sediment production when constructing, reconstructing, or maintaining temporary and permanent water crossings and National BMP Road-5 "Temporary Roads" provides direction to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources from the construction and use of temporary roads.*

*We agree that roads should be constructed to the standard for the use which is proposed and that poorly maintained or unmaintained roads can result in substantial negative impacts to water quality, soils and aquatic resources. Existing roads intended for future use have been identified in the analysis for reconstruction and would be constructed to appropriate standards. Newly constructed roads intended for future use have been identified for construction and would be constructed to appropriate standards. Currently no temporary roads have been identified for project use. If identified, temporary roads would be blocked, ripped, and have appropriate water control features after their use, however in many cases recontouring of these areas would require extensive work and would result in additional negative impacts. Road locations have been identified and reviewed by the interdisciplinary team to minimize impacts from road construction activities and road locations on the landscape.*

*Citations in Attachment 4 were reviewed and analyzed relative to the comments provided.*

**DA-31)** The Opposing Views Attached to these Comments Describe the Resource Degradation and Destruction of Conditions Necessary for Proper Natural Resource Functioning that will occur when the Timber Sale is implemented. The attachments to these comments present the "responsible" opposing views of hundreds of independent, unbiased Ph.D. biological scientists who describe the resource damage caused by the majority of commercial timber and road construction sale activities taken at any location, on any topography, at any elevation, at any time.

The Responsible Official's response to each of these opposing views is governed by 40 C.F.R. § 1502.9(a) and 1502.9(b) which mandate a response to each opposing view. Please note that these laws do not allow the Responsible Official to avoid providing the public with meaningful responses to opposing views for any of the following reasons:
1) because they are opinions. Indeed, viewpoints and opinion are synonyms,
2) because of their source (e.g. newspapers, professional journals, scientific literature etc.),
3) because their source has not been peer reviewed,
4) because the opposing views are not site-specific to this timber sale,

Please review this project in light of the best science attached to the objector's comments and acknowledge, summarize and describe the science conclusions of hundreds of independent, unbiased scientists regarding the impacts of timber sale activities. This would include the science viewpoints quoted in attachments #15, #4, #1, #5, #8, #14, #9a, and #18

The DEIS fails to disclose responsible scientific opinion in opposition to the proposed action, and make a good faith, reasoned response to it.

The DEIS for the Blacksmith timber sale does not "promote the advancement of scientific knowledge of the effects of actions and technology on the environment and encouraging the development of the means to prevent or reduce adverse effects that endanger the health and well-being of man." Not only does this timber sale not promote the advancement of scientific knowledge of the effects of logging, but it ignores and fails to discuss existing scientific knowledge about logging. Please provide meaningful and specific responses to each opposing view included in the attachments to these comments in the final EIS.

***Response:*** *The opposing views were reviewed, and consisted of short quotations from various sources, including quotations from the scientific gray literature, primary science, and popular press. The opposing views were reviewed to determine which opposing views were related to the comments provided by the interested party. Opposing views not related to the comments were not considered in greater depth. The analysis and discussion on attachments is included below.*

**DA-32)** The Blacksmith timber sale proposal is the antithesis of what the American public wants to occur in their national forests

The following quote comes from forest service publication that describes what the public wants from their national forests:

"The public sees the restriction of mineral development and of timber harvest and grazing as being more important than the provision of natural resources to dependent communities (although this is still seen as somewhat important)." (Pg. 28) "Survey results of the American public's values, objectives, beliefs, and attitudes regarding forests and grasslands: A technical document supporting the 2000 USDA Forest Service RPA Assessment". Gen. Tech. Rep. RMRS-GTR-95. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 111 p.

Link to Complete Report: http://www.fs.fed.us/rm/pubs/rmrs_gtr095.pdf

***Response:*** *The 2004 Sierra Nevada Forest Plan Amendment provides desired conditions for land allocations. Goals for management include reducing threats to communities and wildlife habitat from large, severe wildfires, increasing stand sustainability by restoring a species composition and structure that is more resilient, and re-introducing fire into fire-adapted ecosystems. The Forest Plan decision includes managing hazardous fuels in and around communities combined with strategic placement of fuels treatments across broad landscapes to modify wildland fire behavior. The desired conditions for the project area and the need for treatment to move landscapes toward that condition were based upon direction in the Forest Plan.*

**DA-33)** Supervisor Crabtree, there is no "timber famine" as the USFS has been so fond of predicting for many decades. There is no shortage of raw materials for paper and wood products in the United States otherwise the owners of private timberland would not be exporting their lumber. Any national or regional poll or survey indicates the vast majority of the public doesn't want their public land harvested for any reason. In the final EIS please tell the public why this sale is an exception.

Request for final NEPA document modifications that appeared in the objector's comments: Please include a discussion and supporting data in the final EIS showing either:

1) the majority of the general public approves of logging their national forests, or

2) majority of the general public does not approve of logging their national forests.

***Response:*** *The 2004 Sierra Nevada Forest Plan Amendment provides desired condition for land allocations. Goals for management include reducing threats to communities and wildlife habitat from large, severe wildfires, increasing stand sustainability by restoring a species composition and structure that is more resilient, and re-introducing fire into fire-adapted ecosystems. The Forest Plan decision includes managing hazardous fuels in and around communities combined with strategic placement of fuels treatments across broad landscapes to modify wildland fire behavior. The desired conditions for the project area and the need for treatment to move landscapes toward that condition were based upon direction in the Forest Plan.*

**DA-34)** The DEIS does not specifically state "whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted."

Some lay members of the public will not be able to determine if all practicable means to avoid or minimize environmental harm to the natural resources in the forest unless the Responsible makes this statement. However, don't include this statement unless it's true and the "practicable means to avoid or minimize environmental harm" are listed and discussed.

Please assure that the selected alternative avoids or minimizes environmental harm and state in the EIS that "all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted."

***Response:*** *CEQ direction is that the Record of Decision is to "state whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted and if not why they were not" (40CFR1505.2.) The EIS is not a decision document. The Record of Decision will include this information. Mitigations are described in 40 CFR 1502.14(f) and 40 CFR 1502.16(h).*

*According to FSH 1909.15 Chapter 10: "Descriptions of the alternatives should include relevant mitigation measures that could reduce the impacts of the project, even if those measures are outside the jurisdiction of the Agency. Examples include: project design features to avoid or minimize impacts, forest plan requirements, Best Management Practices, and statutory and regulatory requirements related to Federal, State, and local laws and regulations." Design criteria including Best Management Practices proposed for the project alternatives are identified in the NEPA document. Design criteria were developed to minimize risk for resource damage with implementation of project activities. Effects analyses for individual resources are based on the adoption of design criteria described for each alternative. While every action, including no action has some risk associated with it, project design has emphasized minimizing risk of resource damage during implementation of activities designed achieve the Purpose and Need for the project.*

**DA-35)** Where do they find people like you who enthusiastically spend my tax dollars to eliminate the opportunity for future generations to explore intact, undeveloped non-Wilderness public land? If you hired a company to care for your yard while you were on vacation and they cut & logged your shade trees, how would you react when the corporation approached you for payment after you returned? Your proposed timber sale is doing exactly the same thing to the land I own! Please comply with the will of the public you serve.

***Response:*** *The 2004 Sierra Nevada Forest Plan Amendment provides desired conditions for land allocations. Goals for management include reducing threats to communities and wildlife habitat from large, severe wildfires, increasing stand sustainability by restoring a species composition and structure*

*that is more resilient, and re-introducing fire into fire-adapted ecosystems. The Forest Plan decision includes managing hazardous fuels in and around communities combined with strategic placement of fuels treatments across broad landscapes to modify wildland fire behavior. The desired conditions for the project area and the need for treatment to move landscapes toward that condition were based upon direction in the Forest Plan.*

**Below are the responses to citations included in the Attachments received from Dick Artley.**

**Opposing Views Attachment #1: Respected Scientists Reveal the Certainty that Natural Resources in the Forest are Harmed (and some destroyed) by Timber Harvest Activities**

**DA-Attachment 1-A** Opposing Views Attachment #1: Respected Scientists Reveal the Certainty that Natural Resources in the Forest are Harmed (and some destroyed) by Timber Harvest Activities

There are negative effects caused by nearly all actions … this includes the actions necessary to harvest trees. The Responsible Official will find that none of the literature sources for the opposing views below is specific to this project. Information contained in books and/or scientific prediction literature is never specific to individual projects. They describe cause and effects relationships that exist when certain criteria are met … at any location under the vast majority of landscape characteristics.

Indeed, the literature in the References section of the draft NEPA document for this project is not specific to the project yet it was used to help design this project. There are laws against deceiving the public by withholding the information describing the adverse effects of proposed projects so the line-officer might carry out the agency's timber agenda.

***Response:*** *We agree that nearly all actions, including those necessary to harvest trees have the potential to result in negative effects. Direction from 1909.15 states that "for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative". Negative effects of proposed harvest activities are analyzed and documented for each resource in the specific resource reports for the project, and effects are summarized in Chapter 3 of the EIS.*

*There are a variety of reference documents and reports identified in the Reference section of the EIS, including a substantial number of "Reports and Analysis Documents" listed that are project specific. The adverse and beneficial environmental effects specific to this project are presented in the various specialist reports and within the body of the EIS. General scientific literature in many instances is quite relevant in identifying both the beneficial and adverse environmental effects of a project and where relevant citations for this literature are included in the Blacksmith EIS as well.*

**DA-Attachment 1-B** Citations related to impacts of logging to forest resources including soils, riparian and stream areas, habitat, and ecological processes

Timber Harvest Opposing View #2 - "Timber harvest operations have been shown to have many effects on adjacent watercourses and on the aquatic ecosystems they support. This may occur from introductions or loss of woody debris, loss of riparian vegetation, accelerated stream bank and bed erosion, the alteration of natural channel form and process, and the reduction of stream habitat diversity. However, the existing literature indicates one of the most insidious effects of logging is the elevation of sediment loads and increased sedimentation within the drainage basin.

Sediment generation from various forestry practices has been studied extensively in the past. Forestry practices which generate suspended sediments include all operations that disturb soil surfaces such as site preparations, clear-cutting, log skidding, yarding, slash burns, heavy equipment operation and road construction and maintenance."

Anderson, P.G. 1996. "Sediment generation from forestry operations and associated effects on aquatic ecosystems" Proceedings of the Forest-Fish Conference: Land Management Practices Affecting Aquatic Ecosystems, May 1-4, 1996, Calgary, Alberta. http://www.alliance-pipeline.com/contentfiles/45____Sediment_generation.pdf

Timber Harvest Opposing View #3 - "Timber harvest will remove dead and dying material from the site and inhibit the recruitment of downed woody material as time progresses. Timber harvest and associated reduced structural complexity and reduced age and size class diversity are all known to reduce population abundance and diversity of ants and a number of birds. For instance, ants are documented to require downed woody material in a variety of sizes and in all stages of decomposition (*Torgersen and Bull*, 1995). This is an attribute that is negatively correlated with harvest of the dead and dying trees and positively correlated with natural succession, especially after disturbance. Ants and birds are known to predate on insect species which cause mortality to trees, serving as a potentially important population control in the case of epidemics or before they occur (*Campbell, Torgersen and Srivastava*, 1983). Structural and functional characteristics associated with unlogged forests are also important for canopy arthropods, which play an important role in regulating pest outbreaks (*Schowalter*, 1989).

Structural complexity, functional diversity, diversity of ecological process and diversity of structure in roadless areas are all expected to be less susceptible to the outbreak of pests and regulate insect activity in surrounding homogenized forests (*Schowalter and Means*, 1989; *Franklin, Perry, Schowalter, Harmon, McKee and Spies*, 1989).

A large body of scientific evidence also indicates that increased edge effect and increased sunlight into stands, resulting from reduced canopy cover associated with timber harvest, can directly promote the population abundance, productivity and persistence of insects which cause mortality to trees of (*Roland*, 1993; *Rothman and Roland*, 1998; *Kouki, McCullough and Marshall*, 1997; *Bellinger, Ravlin and McManus*, 1989)."

"Applying Ecological Principles to Management of the U.S. National Forests" *Issues in Ecology* Number 6 Spring 2000 http://www.esa.org/science_resources/issues/FileEnglish/issue6.pdf

Timber Harvest Opposing View #19 - "Logging reduces the organic parent material (duff and woody residues) available for soil-formation processes."

Harvey, A. E., M. J. Larsen, and M. F. Jurgensen "Distribution of Ectomycorrhizae in a Mature Douglas-fir/larch Forest Soil in Western Montana" Forest Science, Volume 22, Number 4, 1 December 1976 , pp. 393-398(6)
http://www.ingentaconnect.com/content/saf/fs/1976/00000022/00000004/art00007;jsessionid=l2sdf2hphia2.alexandra

Timber Harvest Opposing View #21 - "SEC. 3. FINDINGS. Congress finds the following:

Commercial logging has many indirect costs which are very significant, but not easily measured, such as flooding damage and relief of flooding damage through Federal funds, damage to the salmon fishing industry; and harm to the recreation and tourism industries."

H. R. 1494 text. April 4, 2001. http://www.agriculturelaw.com/legis/bills107/hr1494.htm

Timber Harvest Opposing View #6 - "Federal auditors have found that the Forest Service frequently fails to assess, prevent or correct environmental damage from logging on the national forests.

After inspecting 12 timber projects in the field from 1995 to 1998, the Agriculture Department's inspector general found that all were deficient and that 'immediate corrective action is needed.'

A new report on the audits found that the environmental studies required before logging was approved were poorly done, the rules to protect streams and wildlife habitat from undue damage during logging were not followed, and the steps planned to repair some of the harm after logging were not carried out.

The inspector general, Roger C. Viadero, reported on Jan. 15 to Mike Dombeck, chief of the Forest Service, that the review had found ''numerous serious deficiencies.'' Agency officials generally agreed with the report's conclusions and recommendations."

Cushman, John H. Jr. "Audit Faults Forest Service on Logging
Damage in U.S. Forests" New York Times, February 5, 1999
http://query.nytimes.com/gst/fullpage.html?res=9B00E2DF163BF936A35751C0A96F958260&sec=&spon=&pagewanted=print

Timber Harvest Opposing View #33 - "Timber harvesting operations affect hydrologic processes by reducing canopy interception and evapotranspiration. Many studies have documented changes in soil properties following tractor yarding (Stone, 1977; Cafferata, l983), and low-ground-pressure skidding (Sidle and Drlica, 1981). More recently, researchers have evaluated cable yarding (Miller and Sirois, 1986; Purser and Cundy, 1992). In general, these studies report decreased hydraulic conductivity and increased bulk density in forest soils after harvest."

Keppeler, Elizabeth T. Robert R. Ziemer Ph.D., and Peter H. Cafferata "Effects of Human-Induced Changes on Hydrologic Systems." An American Water Resources Association publication, June 1994 http://www.fs.fed.us/psw/publications/ziemer/Ziemer94a.PDF
Timber Harvest Opposing View #40 - "Logging removes a mass that harbor a myriad of organisms, from bacteria and actinomycetes to higher fungi. The smaller organisms, not visible to the unaided eye, are still important components of the system."

Maser, C. Ph.D., and J. M. Trappe Ph.D. "The Seen and Unseen World of the Fallen Tree", 1984 USDA Forest Service, GTR-PNW-164 http://www.fs.fed.us/pnw/publications/pnw_gtr164/

Timber Harvest Opposing View #41 - "Logging removes mature and maturing trees which conserve essential elements, whereas the area containing new very young planted trees following logging are susceptible to erosion and essential element loss." (pg.5)

"Logging removes tree parts that would have created and maintained diversity in forest communities." (pg. 44)

Maser, C. Ph.D., R. F. Tarrant, J. M. Trappe Ph.D., and J. F. Franklin Ph.D. 1988 "The Forest to the Sea: A Story of Fallen Trees" USDA Forest Service, GTR-PNW-GTR-229 http://www.fs.fed.us/pnw/publications/pnw_gtr229/

Timber Harvest Opposing View #43 - "Logging practices can indirectly result in changes in the biological components of a stream, and can have direct and indirect on the physical environment in streams.

The primary environmental changes of concern are the effects of siltation, logging debris, gravel scouring, destruction of developing embryos and alevins, blockage of streamflow, decrease in surface and intragravel dissolved oxygen, increase in maximum and diel water temperatures, changes in pool/riffle ratios and cover, redistribution of fishes, reduction in fish numbers, and reduction in total biomass."

Moring, John R. Ph.D. 1975. "The Alsea Watershed Study: Effects of Logging on the Aquatic Resources of Three Headwater Streams of the Alsea River, Oregon – Part III." Fishery Report Number 9 Oregon Department of Fish and Wildlife.
http://www.for.gov.bc.ca/hfd/library/ffip/Moring_JR1975b.pdf

Timber Harvest Opposing View #70 - "Logging equipment compacts soils. Logging removes biomass critical to future soil productivity of the forest. Logging disturbs sensitive wildlife. Logging typically requires roads and skid trails which create chronic sources of sedimentation that degrades water quality and aquatic organism habitat. Logging roads and skid trails are also a major vector for the spread of weeds. Logging disrupts nutrient cycling and flows. Logging can alter species composition and age structure (i.e. loss of old growth). Logging can alter fire regimes. Logging can change water cycling and water balance in a drainage. The litany of negative impacts is much longer,

but suffice it to say that anyone who suggests that logging is a benefit or benign is not doing a full accounting of costs."

Those who suggest that logging "benefits" the forest ecosystem are using very narrow definitions of "benefit." Much as some might claim that smoking helps people to lose weight and is a "benefit" of smoking."

Wuerthner, George "Who Will Speak For the Forests?" NewWest, January 27, 2009 http://www.newwest.net/topic/article/who_will_speak_for_the_forests/C564/L564/

Timber Harvest Opposing View #74 - "CONCLUSIONS
In our overview of the impacts of forest management activities on soil erosion and productivity, we show that erosion alone is seldom the cause of greatly reduced site productivity. However, erosion, in combination with other site factors, works to degrade productivity on the scale of decades and centuries. Extreme disturbances, such as wildfire or tractor logging, cause the loss of nutrients, mycorrhizae, and organic matter. These combined losses reduce long-term site productivity and may lead to sustained periods of extended erosion that could exacerbate degradation.

Managers should be concerned with harvesting impacts, site preparation disturbances, amount of tree that is removed, and the accumulation of fuel from fire suppression. On erosion-sensitive sites, we need to carefully evaluate such management factors."

Elliot, W.J.; Page-Dumroese, D.; Robichaud, P.R. 1999. The effects of forest management on erosion and soil productivity. Proceedings of the Symposium on Soil
Quality and Erosion Interaction, Keystone, CO, July 7, 1996. Ankeney, IA: Soil and Water Conservation Society. 16 p. http://forest.moscowfsl.wsu.edu/smp/docs/docs/Elliot_1-57444-100-0.html

***Response:*** *The citations point to general impacts related to commercial timber harvest. Forest Service policy is that for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative (FSH 1909.15).*

*While site specific effects resulting from precipitation and climate in multiple citations above differ in important ways from the Mediterranean climate-acclimated Sierra Nevada forests in general and the Blacksmith project area more specifically, and some of the studies looked at more intensive harvest practices than proposed in the Blacksmith project, the indicated effects in these citations are discussed relative to general impacts to forest resources from timber harvest activities.*

*Sierra Nevada mixed conifer forests experienced a natural fire regime that was characterized by low to mixed severity fires that occurred every 0-35 years (Fire Regime I). Historic management practices and disruption of the natural fire regime have dramatically altered the forested systems in the Sierra Nevad mixed conifer forests. These changes have led to distinct shifts in forest composition and structure: 1)*

*large trees are less numerous 2) small trees are higher in density and 3) there has been a shift in species away from pine (more fire resistant, shade intolerant and important to several at-risk wildlife species) to fir (shade tolerant, less fire resistant) (Knapp et al. 2013, Collins and Stephens 2010, North et al. 2008, Thorne et al. 2008). These changes have shifted the Sierra Nevada mixed conifer forests outside of the natural range of variability for vegetation and fuels composition, fire frequency, behavior and severity (Safford 2013). These forests are now at a high risk of loss of key ecosystem components*

*This shift outside of the natural range of variability has caused significant ecological concerns. Overly dense stands are susceptible to insect and disease-related attack, especially during periods of extended drought and are at greater risk of high mortality levels in the near future (Fettig et al. 2007). Competition among trees for limited resources, such as water, nutrients, and sunlight, create demands higher than what is sustainable for survival (Kolb et al. 1998). Large tree mortality has significantly increased in the Sierra Nevada (Bouldin 1999, van Mantgem and Stephenson 2007, Lutz et al. 2009). The increase in large tree morality appears to be linked to fire suppression (Bouldin 1999, Lutz et al. 2009) and climate change (van Mantgem and Stephenson 2007, van Mantgem et al. 2009). Consequently, large tree mortality should not be "promoted" but will be mitigated in order to reduce the loss of these high value wildlife structures.*

*The provided citations do not provide new scientific information. We recognize that immediate and short term damage to forest resources occurs as a result of commercial timber harvest using mechanized equipment. The analysis found that proposed activities could cause both beneficial and detrimental effects, but that implementation of design criteria would prevent or minimize negative effects. Best management practices, stream buffers, timing of work, designation of skid trails and landings, and other Design Criteria for the project are designed to reduce the impact to forest resources and prevent significant impacts.*

*Negative impacts to forest resources from implementation of the Proposed Action and from alternatives to the Proposed Action are discussed in detail in the specialist reports for the project, and are summarized in the Effects section of the EIS. The Blacksmith EIS discloses the site specific, expected effects on soil and water as a result of the proposed activities for this project on the soil types, topography and hydrologic conditions and processes relevant to the project area.*

*The No Action Alternative and the Non-Commercial Alternative both address this issue. All alternatives have some adverse effect, including No Action. It is the responsibility of the deciding official to weigh the negative and positive effects of any action on the human environment and consider alternatives analyzed in the environmental documents before rendering a decision.*

*One cited article reports on a 1999 OIG audit of the Forest Service which did not include the Eldorado National Forest. The Blacksmith project includes design criteria to prevent or minimize negative effects. Annual Eldorado National Forest monitoring reports and periodic Best Management Practice audits demonstrate that problems such as those described in the article are uncommon on this national forest.*

*BMP implementation and effectiveness evaluations conducted utilizing Region 5 USFS protocols (USFS, 2002) on the Eldorado National Forest from 2008 through 2012 (a total of 142 evaluations) indicate that*

*BMPs were implemented as prescribed and effective 94 % of the time, and not implemented as prescribed but still effective 2 % of the time. BMPs were rated at risk or not effective only 4 % of the time. (Project Hydrology Report, Norman and Tolley, 2013)*

*The 2004 SNFPA defines ground disturbing activities as those that result in detrimental soil compaction or a loss of organic matter beyond the thresholds identified by soil quality standards. The activities that this project proposes that would meet that definition are skid trails, temporary road construction, and landings. For purposes of the Blacksmith EIS, proposed road construction, reconstruction and operations have been designed by professional road engineers and foresters; and considered, analyzed and documented by qualified and experienced hydrologists, soil scientists, foresters and biologists based upon site specific information. It is important to note that the cited reference (Anderson, P.G. 1996) includes a discussion concerning "Mitigation Measures". Anderson includes in his summarization that "... disturbances can be largely circumvented by proper design and planning. As discussed previously, logging road construction and operation can dramatically increase sediment loads in streams. The amount of disturbance caused by road construction and maintenance depends upon its design standard, gradient, total distance of road and intensity of use.*

**DA-Attachment 1-C** Introduction of diseases and pests, increased fire severity, decreases in biodiversity and increased susceptibility to adverse weather (such as drought) and exotic invaders.

Timber Harvest Opposing View #36 - "I will turn first to forest thinning aimed at reducing fire risks. There is surprisingly little scientific information about how thinning actually affects overall fire risk in national forests."

"How can it be that thinning could increase fire risks? First, thinning lets in sunlight and wind, both of which dry out the forest interior and increase flammability. Second, the most flammable material - brush, limbs, twigs, needles, and saplings - is difficult to remove and often left behind. Third, opening up forests promotes brushy, flammable undergrowth. Fourth, logging equipment compacts soil so that water runs off instead of filtering in to keep soils moist and trees healthy. Fifth, thinning introduces diseases and pests, wounds the trees left behind, and generally disrupts natural processes, including some that regulate forest health, all the more so if road construction is involved."

Lawrence, Nathaniel, NRDC senior attorney "Gridlock on the National Forests" Testimony before the U.S. House of Representatives Subcommittee on Forests and Forest Health (Committee on Resources) December 4, 2001. http://www.nrdc.org/land/forests/tnl1201.asp

Timber Harvest Opposing View #44 - "Biodiversity in managed ecosystems is poor. Less biodiverse communities and ecosystems are more susceptible to adverse weather (such as drought) and exotic invaders, and have greatly reduced rates of biomass production and nutrient cycling."

"All of these studies show that ecosystem functioning is decreased as the number of species in a community decreases. Declines in functioning can be particularly acute when the number of species is low, such as in most managed ecosystems including croplands or timber plantations."

"Recent evidence demonstrates that both the magnitude and stability of ecosystem functioning are likely to be significantly altered by declines in local diversity, especially when diversity reaches the low levels typical of managed ecosystems."

Naeem, Shahid Ph.D., F.S. Chapin III Ph.D., Robert Costanza Ph.D., Paul R. Ehrlich Ph.D., Frank B. Golley Ph.D., David U. Hooper Ph.D. J.H. Lawton Ph.D., Robert V. O'Neill Ph.D., Harold A. Mooney Ph.D. Osvaldo E. Sala Ph.D., Amy J. Symstad Ph.D., and David Tilman Ph.D. "Biodiversity and Ecosystem Functioning: Maintaining Natural Life Support Processes." Issues in Ecology No. 4. Fall 1999. http://www.esa.org/science_resources/issues/TextIssues/issue4.php

Timber Harvest Opposing View #54 - "It is well established that logging and roadbuilding often increase both fuel loading and fire risk. For example, the Sierra Nevada Ecosystem Project (SNEP) Science Team (1996) concluded that "timber harvest…. has increased fire severity more than any other recent human activity" in the Sierra Nevada. Timber harvest may increase fire hazard by drying of microclimate associated with canopy opening and with roads, by increases in fuel loading by generation of activity fuels, by increases in ignition sources associated with machinery and roads, by changes in species composition due to opening of stands, by the spread of highly flammable non native weeds, insects and disease, and by decreases in forest health associated with damage to soil and residual trees (DellaSala and Frost, 2001; Graham et al., 2001; Weatherspoon et al., 1992; SNEP Science Team, 1996). Indeed a recent literature review reported that some studies have found a positive correlation between the occurrence of past logging and present fire hazard in some forest types in the Interior Columbia Basin (DellaSala and Frost, 2001)."

Roberson, Emily B. Ph.D., Senior Policy Analyst, California Native Plant Society Excerpt from a letter to Chief Dale Bosworth and 5 members of congress
http://www.plantsocieties.org/PDFs/Fire%20letter%20CNPS%208.02%20letterhead.pdf

Timber Harvest Opposing View #64 - "Indiscriminate logging is not a viable solution to reducing wildfire risk. Logging can actually increase fire danger by leaving flammable debris on the forest floor. Loss of tree canopy lets the sun in, encouraging the growth of brush, increases wind speed and air temperature, and decreases the humidity in the forest, making fire conditions even worse."

**Thomas, Craig. "**Living with risk: Homeowners face the responsibility and challenge of developing defenses against wildfires." **Sacramento Bee newspaper, July 1, 2007.**
http://www.sierraforestlegacy.org/NR_InTheNews/SFLIP_2007-07-01_SacramentoBee.php

***Response:*** *Forest Service policy is that for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative (FSH 1909.15). The potential risk for proposed activities to increase mortality of desired residual trees though increased insect and disease activities is discussed in the Silviculture Report for the project and is summarized in Chapter 3 of the EIS.*

*Fire Hazard*

*The Blacksmith EIS conclusions regarding the effects of thinning on fire hazard are based upon peer-reviewed literature. The Blacksmith Project includes treatment of activity fuels to minimize the fire hazard posed by slash. The Blacksmith Project fuels report addresses the change in fuels and fire conditions that would occur with the proposed treatments.*

*A specific purpose of the Blacksmith Project is to design treatments to increase the heterogeneity within the landscape by increasing heterogeneity at fine and coarse scales using topography as a guide by varying treatments. The comments provide no site specific information that this objective would not be attained on the Blacksmith project. The Blacksmith EIS addresses the effects of the proposed actions upon biodiversity*

*The cited reference from Craig Thomas in the Sacramento Bee in 2007 is an opinion article published in a newspaper that encourages fire-wise construction of homes in the interface and maintenance of defensible space, activities that are supported and encouraged by the Forest Service. Craig Thomas was a collaborator on the Blacksmith project and the preferred alternative.*

*Theoretical benefits of fuel manipulation in the manner proposed in the project have been supported by reviews of wildfires and their interaction with fuel treatment areas (Raymond and Peterson, 2005; Omi et al. 2006; Angora Fire Preliminary Effects Assessment, 2007; The Cone Fire and the Lessons of an Accidental Experiment 2007; and Safford et al, 2012). Findings from Raymond and Peterson (2005) showed that thinning alone "increased surface fuels, which contributed to greater surface fire intensity", but that "thinning followed by understory burning reduced canopy, ladder, and surface fuels, thereby decreasing surface fire intensity and crown fire potential" indicating that "fuel treatments intended to minimize tree mortality will be most effective if both ladder and surface fuels are treated". Findings from Omi et al. 2006 further provide evidence that thinning alone can increase fire behavior, while thinning followed up by treatment of surface fuels provided the most effective results for reducing extreme wildfire behavior. Proposed treatments within the project area include not only thinning, but also specifically prescribe follow up machine-piling and burning as initial treatments to treat surface fuel, and prescribed burning as follow up treatment within 2-7 years. Initial treatments of commercially thinning trees followed by piling and pile burning of slash and fuel already present in the proposed treatment units is expected to occur within 1-2 years after the decision with selection of the Proposed Action Alternative. Post fire assessments of the Angora Fire and the Cone Fire in 2007 further validate the effectiveness of the type of treatment proposed with the project.*

*Mid-flame windspeeds are taken into account in the fire modeling through wind reduction factors corresponding to 20 foot winds and canopy cover. These adjustments carry over into the crown fire modeling results (what the commenter refers to as "torching index" and "crowning index"). Fire mortality outputs were not included in the fuels analysis.*

*The three categories of fuel exposure from which the wind adjustment factors are derived are as follows:*

- ***Unsheltered Fuels**: Fuel exposed directly to the wind – no overstory or sparse overstory; fuel beneath timber that has lost its foliage; fuel beneath timber near clearings or clearcuts; fuel on high ridges where trees offer little shelter from wind.*

- ***Partially Sheltered Fuels****: Fuel beneath patchy timber where it is not well sheltered; fuel beneath standing timber at midslope or higher on a mountain with wind blowing directly at the slope.*
- ***Fully Sheltered Fuels****: Fuel sheltered beneath standing timber on flat or gentle slope or near base of mountain with steep slopes.*

*The reduction factors from the 20 foot winds for these categories are as follows:*

| ***Fuel Exposure*** | ***Fuel Model*** | ***Adjustment Factor*** |
|---|---|---|
| *Unsheltered Fuels* | *4* | *0.6* |
| *Unsheltered Fuels* | *13* | *0.5* |
| *Unsheltered Fuels* | *1,2,3,5,6,7,8,9,10,11,12* | *0.4* |
| *Partially Sheltered Fuels* | *All* | *0.3* |
| *Fully Sheltered Fuels* | *All (open stands)* | *0.2* |
| *Fully Sheltered Fuels* | *All (closed stands)* | *0.1* |

*An example of the resulting windspeeds for differing fuel exposure categories with the same 20 foot windspeeds follows:*

***20 foot windspeed – 20 mph***

| ***Fuel Exposure*** | ***Fuel Model*** | ***Mid-Flame Windspeed*** |
|---|---|---|
| *Unsheltered Fuels* | *4* | *12 mph* |
| *Unsheltered Fuels* | *13* | *10 mph* |
| *Unsheltered Fuels* | *1,2,3,5,6,7,8,9,10,11,12* | *8 mph* |
| *Partially Sheltered Fuels* | *All* | *6 mph* |
| *Fully Sheltered Fuels* | *All (open stands)* | *4 mph* |
| *Fully Sheltered Fuels* | *All (closed stands)* | *2 mph* |

*It is noted that while reduction in canopy cover does indeed increase potential mid-flame windspeed, the reduction in the amount of and the rearrangement of fuels available for burning is reduced by a degree that more than compensates (changing to a lower fire behavior fuel model). In addition, researchers have shown that in a Mediterranean climate that is typified by an extended dry period, ample time for fuel moistures to equilibrate exists, even among sites with highly variable stand densities and canopy covers. In areas like these, thinning does not appear to result in relatively lower fuel moistures or increased risk of ignition during the height of the fire season (Estes et al. 2012, Schmidt et al. 2008).*

*In the publication Effects of Fuels Treatments on Wildfire Severity (Omi and Martinson, 2002) the authors write that:*

*"Theoretically, fuel treatments have the potential to exacerbate fire behavior. Crown Fuel reduction exposes surface fuels to increased solar radiation, which would be expected to lower fuel moisture content and promote production of fine herbaceous fuels. Surface fuels may also be exposed to intensified wind fields, accelerating both desiccation and heat transfer. Treatments that include prescribed burning will increase nutrient availability and further stimulate production of fuels with high surface-area-to-volume ratios. All these factors facilitate the combustion process, increase rates of heat release, and intensity surface fire behavior. Fuel treatments may therefore seem nonsensical and ill-advised to some, especially when objectives include conversion to a fuel model 7,8, or 8 to fuel model 2 (Anderson, 1982): a condition predicted to be more hazardous by fire behavior models that ignore crown fire potential. But crown fire potential cannot be ignored. While surface fire intensity is a critical factor in crown fire initiation, height to crown; the vertical continuity between fuel strata, is equally important. Further, crown fire propagation is dependent on the abundance and horizontal continuity of canopy fuels. Thus, treatments that reduce canopy fuels increase and decrease fire hazard simultaneously. With little empirical evidence and an infant crown fire theory, fuel treatment practitioners have gambled that a reduction in crown fuels outweighs any increase in surface fire hazard. Our research demonstrates that their bets have been well placed."*

*<u>Forest Health and Biodiversity</u>*
*While the health of forest trees and sustainability of forest stands is a central component of the recognized need for the project the description provided in the scoping notice that "the structure of the current forested landscape represents an unstable, unsustainable, and therefore undesirable departure from the historic landscape for this area" was not limited growth and vigor of trees. In addition the health of forest trees the project development and analysis has included health of forest soils, wildlife habitat, plants, and aquatic habitat. In this context, the definition of a forest as healthy when biotic and abiotic influences on forests do not threaten management objectives now or in the future applies to the multiple resources and ecosystem services that the Forest Service is responsible for managing. Protection and enhancement of forest resources including the minimization of damage to residual trees is included in the Proposed Action and in Design Criteria for the project.*

*While it is true that some managed ecosystems such as croplands, and short rotation, intensively managed plantations can be less biodiverse than unmanaged stands; we do not believe that the management actions proposed in this project will pose a threat to biodiversity. It is important to consider the effects those alterations in species composition, habitat quality, and diversity of size classes and forest types that historic logging practices, grazing, mining, and fire suppression have had within these ecosystems. We recognize that the Sierra Nevada Ecosystem Project final report to congress in 1996 concluded that systems in the Sierra Nevada had been greatly simplified over the past 100 years as part of the purpose and need for this project and accordingly have proposed activities to increase stand resiliency and biodiversity within the project area. The scoping notice describes this need in the following paragraph: "There is a need to apply the necessary silvicultural and fuels reduction treatments to accelerate the development of key habitat and old forest characteristics, increase stand heterogeneity,*

*restore pine, and to promote hardwoods". To various degrees the forest has been changed from one dominated by large, old, widely spaced trees to one with dense, fairly even-aged stands with most of the larger trees between 80 and 100 years old. This is an unstable, unsustainable forest that is susceptible to drought-induced mortality, bark beetle infestation, and severe wildfire.*

*In proposed thinning units we expect understory plants which are currently absent from many of the timber stands due to the heavy accumulation of duff and fuel on the forest floor to become more abundant and diverse post treatment (Knapp et al. 2013). This would expand the number of wildlife species able to occupy these stands due to increased food availability, however we expect some species may be potentially excluded in the short-term due to project activities. Tree species would maintain current diversity, however there would be a shift in species dominance within the stand as a percentage trees per acre and basal area per acre, consistent with management objectives. Follow-up prescribe burning is expected to further encourage species expansion through promotion of sprouting and increased space availability for windblown seeds.*

*We expect treatments to aid in preservation of biodiversity post fire. Uncharacteristic, high severity wildfire, in the project area can have a negative effect on species diversity through soil loss and high levels of mortality over large areas eliminating seed sources. Safford et al. (2012) found that post fire stands that burned in the Angora Fire and were treated with similar treatments to those proposed in this project had significantly higher levels of tree survival, reduced bark beetle attack, higher percentages of understory survival, and greater soil retention then stands where fuels were not treated.*

*In addition, in Sierra Nevada mid-elevation forests, biodiversity of plants, fungi, and wildlife is not greatest in high-severity burned patches, but is maximized in diverse landscapes that incorporate a matrix of burn severities, forest seral stages (including managed forests), and most importantly, habitat diversity (Graber and Parsons 1998, Wayman and North 2007, Kennedy and Fontaine 2009, Vierling and Lentile 2008).*

*In plantation stands proposed for treatment with mastication we expect an increase in the number of forbs and grassed that establish. Monitoring conducted in plantations treated on the Pacific District with mastication and follow-up herbicide showed increases in native forbs and grasses that were unable to establish in untreated plantations due to high brush cover.*

*Furthermore, retention of large trees, dead trees and large down woody material is provided for in the design criteria of the project through the retention of all dead trees greater than 16 inches dbh, all down logs greater than 12 inches diameter and 10 feet in length, and all trees greater than 30 inches in diameter that do not need to be removed to facilitate project activities.*

*<u>Invasive Plants</u>*
*Presence of invasive plants within the project area and probability of expansion due to project activities with proposed mitigation measures are analyzed in the Noxious Weed Assessment for the project, available in the project file. The proposal includes treatment of current noxious weeds and those that may be spread through project activities.*

**DA-Attachment 1-D** Citations suggesting that fire behavior modification and timber harvest is not needed or suitable in the project area.

Timber Harvest Opposing View #49 - "In response to catastrophic wildfires, wide-reaching forest management policies have been enacted in recent years, most notably the Healthy Forests Restoration Act of 2003. A key premise underlying these policies is that fire suppression has resulted in denser forests than were present historically in some western forest types. Therefore, although reducing the threat of wildfire is the primary goal, forest managers commonly view fuel treatments as a means to restore historic forest structure in those forest types that are outside of their historic range of variation. This study evaluates where both wildfire mitigation and restoration of historic forest structure are potentially needed in the ponderosa pine–dominated montane forest zone of Boulder County, Colorado. Two spatial models were overlain: a model of potential fireline intensity and a model of historic fire frequency. The overlay was then aggregated by land management classes.

Contrary to current assumptions, results of this study indicate that both wildfire mitigation and restoration of historic forest structure are needed in only a small part of the study area, primarily at low elevations.

Furthermore, little of this land is located on Forest Service land where most of the current thinning projects are taking place. We question the validity of thinning as a means both to reduce the threat of wildfire and to restore historic forest structure in the absence of site-specific data collection on past and present landscape conditions."

Platt, Rutherford V. Ph.D., Thomas T. Veblen Ph.D., and Rosemary L. Sherriff "Are Wildfire Mitigation and Restoration of Historic Forest Structure Compatible? A Spatial Modeling Assessment" Published Online: by the by Association of American Geographers. Sep. 8, 2006 http://www.ingentaconnect.com/content/routledg/anna/2006/00000096/00000003/art00001

Timber Harvest Opposing View #50 - "Private lands are more suitable for timber production. National Forest land is on average of lower productivity and on steeper, higher elevation terrain than are private forestlands."

Powell, Douglas S. Ph.D, Joanne L. Faulkner, David R. Darr, Zhiliang Zhu Ph.D. and Douglas W. MacCleery. 1992. "Forest Resources of the United States." USDA Forest Service. Rocky Mt. Forest and Range Experiment Station. Gen. Tech. Rep. RM-234. http://www.fs.fed.us/rm/pubs_rm/rm_gtr234.html

***Response:*** *Modeling of potential fireline intensity for the Blacksmith project showed extreme fire behavior during 90th percentile weather conditions for a majority of the project area. Data used for modeling results of predicted fire behavior in the project area, and an explanation of modeling results are included in the project Fuels Report in the project file. Changes in fire severity within the Sierra Nevada have been quantitatively documented by Miller et al. 2009. In the study, fire severity for the mixed conifer forest within the portion of the Sierra Nevada range where the project is located*

*was found to have significantly increased over the time period studied. The Miller et. al study is referenced in the Scoping Notice and the environmental analysis for the project. The need for and occurrence of treatment on ownership patterns in the Sierra Nevada mixed conifer forest cannot be directly compared with the Montane forest zone of Boulder County, Colorado.*

*The Douglas et al. article is a generalization for a National trend that cannot be applied to the specific project area or the Eldorado National Forest. The removal of commercial sized trees in order to meet fuel and forest health objectives provides the benefit of enabling the forest to also accomplish other needed fuels reduction and forest health work with the revenue derived from their removal. When the National Forests were created much of the more accessible, highly productive forest areas of the United States were no longer in public domain, however; average description of National Forest lands across the United States as generally lower productivity and on steeper, higher elevation slopes does not accurately characterize the Northern portion of the Georgetown District where project is proposed. The proposed treatment areas within the project area are characterized by large areas of relatively high growing sites and flat ridge-tops.*

*Recent large wildfires are very different from presettlement fires with respect to the average proportion of high severity fire within the fire perimeter. High severity patches more than a few acres in size were relatively unusual in fires in the Sierra Nevada before Euro-American settlement in the mid-1800s (Show and Kotok 1924, Kilgore 1973, Stephenson et al 1991, Weatherspoon et al. 1992, , Skinner and Chang 1996, Weatherspoon and Skinner 1996). Miller et al. (2009) show that the average size of high severity patches in Sierra Nevada wildfires has increased by about 100% over the last 25 years. It is true that much of the total area of high severity fire in "natural" mixed conifer and yellow pine forests is contributed by large patches of 10's to 100's of acres, but these large patches are relatively rare. The median patch size reported by Collins and Stephens (2010) is 5.4 acres. In any case, the three primary objectives for decreasing the potential for severe wildfire effects to forest resources include: 1) improve the treated stands' ability to withstand a wildfire; 2) moderate expected wildfire behavior at the landscape level through strategic placement of fuels reduction activities; and 3) improve efficiency and safety of future wildfire suppression operations.*

*Range wide studies of the Sierra Nevada by Boudin (1999) and Thorne (2008)and the SNEP final report to congress (1996) have shown a shift in species composition and forest structure within the mixed conifer forest of the Sierra Nevada, where this project is located. This shift has been determined to be unsustainable and therefore undesirable through site specific review of stands proposed for treatment by forest health specialists and wildlife biologists. Based on site specific review of stands, the proposal was developed to move stands toward the desired condition described for the land allocation described in the purpose and need for the project.*

*The Blacksmith Project had a landscape assessment completed (Estes, 2012) that addressed the past landscape vegetation conditions. Current stand structure indicates how decades of fire suppression have affected this Project Area. Many stands are on ridge top, or southern, or southwestern aspects and are comprised of large, widely-scattered old ponderosa pine and sugar pine trees that are surrounded by a dense cohort of smaller and younger shade tolerant fir trees. The historic condition*

*here supported a mixed severity fire regime, but the current condition may result in a much bigger fire with larger areas of high severity burning within the Project Area.*

**DA-Attachment 1-E** Citations expressing general opinions against logging

Timber Harvest Opposing View #4 - "The biggest ecological con job in years is being waged by the U.S. Republican party and their timber industry cronies. They are blaming the recent Western wildfires on environmentalists, and assuring the public that commercial logging will reduce the risk of catastrophic wildfires."

Barry, Glen, Ph.D. "Commercial Logging Caused Wildfires" Published by the Portland Independent Media Center, August 2002. http://portland.indymedia.org/en/2002/08/17464.shtml

Timber Harvest Opposing View #5 - "According to a 1998 poll by a firm that has worked for several Republican House members and two presidents, 69 percent of Americans oppose commercial logging on federally owned land. The Forests Service's own poll showed that 59 percent of Americans who expressed an opinion oppose timber sales and other commodity production in national forests."

"Many Americans are surprised to learn that logging is even allowed on public lands. Alas, it has been since the Organic Act of 1897 first authorized logging in America's new forest reserves. That legislation called for watershed protection and a steady supply of timber - what the Forest Service calls 'multiple use.' "

"But the agency has been unable to balance those goals. More often than not, the integrity of the forest ecosystem has been sacrificed to maximize timber and other commodities. And at taxpayer expense, notes Bernie Zaleha, chair of the End Commercial Logging on Federal Lands (ECL) campaign. The Forest Service lost $2 billion on its logging program from 1992 to 1997, according to the General Accounting Office. It spends more on building roads and preparing sales than it gets back in timber receipts."

Barry, John Byrne. "Stop the Logging, Start the Restoration"
from The Planet newsletter
June 1999, Volume 6, Number 5
http://www.sierraclub.org/planet/199905/ecl1.asp

Timber Harvest Opposing View #9 - "For much of the past century the Forest Service, entrusted as the institutional steward of our National Forests, focused its management on an industrial-scale logging program. The result of the massive logging and road construction program was to damage watersheds, destroy wildlife habitat and imperil plant and animal species."

"The continued logging of our National Forests also wastes American tax dollars and diminishes the possibilities of future economic benefits. The Forest Service lost $2 billion dollars on the commercial logging program between 1992-1997. Annually, timber produces roughly $4 billion while recreation,

fish and wildlife, clean water, and unroaded areas provide a combined total of $224 billion to the American economy. Forests purify our drinking water - 60 million Americans get their drinking water from National Forests. When the dramatic values of ecological goods and services are taken into account, it is clear that protecting National Forests creates more economic benefits than continued logging."

Ehrlich, Anne Ph.D., David Foster Ph.D. and Peter Raven Ph.D. 2002
"Call to End Logging Based on Conservation Biology." Native Forest Network.
http://www.nativeforest.org/campaigns/public_lands/stb_5_30_02.htm

Timber Harvest Opposing View #10 - "The Bush administration has announced plans to greatly increase logging on federal lands in order to reduce the risk of wildfires. The Forest Service is using the fear of wildfires to allow logging companies to remove medium-and large-diameter trees that they can sell, rather than just the small trees and brush that can make fires more severe. There is little evidence to show that such logging will prevent catastrophic fires; on the contrary, logging roads and industrial logging cause wildfires. Bush is a well known supporter of the timber industry and has accepted huge sums of money from wealthy timber company leaders. He is promoting misinformation about forest fires in order to benefit timber industry campaign contributors."

"Bush Fire Policy: Clearing Forests So They Do Not Burn" FOREST CONSERVATION NEWS TODAY, August 27, 2002 http://forests.org/archived_site/today/recent/2002/tiporefl.htm

Timber Harvest Opposing View #13 - "But the majority of the protesters were angry about Bush's plans to implement rules that would thin our national forests to reduce fire risk. Cascadia Forest Alliance volunteer Carrie Taylor said Bush's plan to log mature and old forests "will only increase fire risks while providing taxpayer subsidized logs to the timber industry."

"According to the Cascadia Forest Alliance, under the Bush proposal, 'environmental laws and citizen involvement will be undermined or suspended so that federal land management agencies can increase logging and roadbuilding on public lands, one of the timber industry's highest priorities.'"

Giuliano, Jackie Alan, Ph.D. "Fire Suppression Bush Style: Cut Down the Trees!" Environmental News Service, 2008. http://www.ens-newswire.com/ens/aug2002/2002-08-23g.asp

Timber Harvest Opposing View #18 - "Recent editorials by timber industry spokespersons are a wildly misleading attempt to promote increased logging of western U.S. forests under the guise of reducing wildland fires …"

Hanson, Chad Ph.D., "Logging Industry Misleads on Climate and Forest Fires." Guest Commentary in New West, July 11, 2008
http://www.newwest.net/topic/article/logging_industry_misleads_on_climate_and_forest_fires/C41/L41/

Timber Harvest Opposing View #59 - "Logging on the National Forests provides less than 5% of the nation's timber supply, but costs the taxpayers more than 1 billion dollars in subsidies every year. Nor is logging a good job provider compared to recreation, which by Forest Service estimates provides over 30 times the economic benefits of logging. These forests are the last remnants of the virgin forests that covered the country, and now have far more value as forest ecosystems, watershed/water supply protection, and recreational assets than for logging. In fact, the justification for the Weeks Act in 1911 which established national forests in the east, was watershed protection.

(A major barrier to the Forest Service changing its ways is that these increased recreational economic benefits flow into the local economy, not to the Forest Service itself, whereas extractive uses of the national forests contribute directly to Forest Service budgets.)

"Our nation is engaged in a great debate over the real purpose of our national forests, with the weight of public opinion swinging more and more strongly toward preservation. Certainly this nation should not be subsidizing logging when it is clear that we understand so little about the functioning of these enormously complex and ancient forest ecosystems that provide of people with clean air and water, as well as homes for a myriad of plants and wildlife that can live nowhere else."

Sierra Club. 2005 "Ending Commercial Logging on Public Lands"
http://northcarolina.sierraclub.org/pisgah/conservation/ecl.html

Timber Harvest Opposing View #56 - "People moving to the region may do so for reasons related to the social environment and the physical landscape but not care about specific Federal land management practices. We found this not to be true, since 92 percent were concerned with how Federal lands were managed. The most frequent preferences for managing Federal lands were water/watershed and ecosystem protection (table 3). Timber harvesting was cited by 16 percent, grazing and ranching by 6 percent, and mineral exploration/mining by less than 1 percent. Overall, protective strategies made up 76 percent of the preferred management strategies and commodity-based strategies 23 percent. This same trend is evident for the second and third most stated preferences. These findings also contradict the longstanding view of the Federal lands as a public warehouse of commodities to be harvested and jobs to be filled. For newcomers in the rural West, the value of these public lands is related to protecting and preserving them."

Rudzitis, Gundars. 1999 "Amenities Increasingly Draw People to the Rural West"
Rural Development Perspectives, vol. 14, no. 2
http://www.ers.usda.gov/publications/rdp/rdpsept99/rdpsept99b.pdf

***Response**: The 2004 Sierra Nevada Forest Plan Amendment provides desired conditions for land allocations. Goals for fire and fuels management include reducing threats to communities and wildlife habitat from large, severe wildfires and re-introducing fire into fire-adapted ecosystems. The Forest Plan decision includes managing hazardous fuels in and around communities combined with strategic placement of fuels treatments across broad landscapes to modify wildland fire behavior. The desired conditions for the project area and the need for treatment to move landscapes toward that condition were based upon direction in the Forest Plan.*

*The above references primarily refer to political opinions or positions of various organizations and individuals about restricting or removing the policy of commercial timber harvest from National Forest System lands. Comments express a view that timber harvest should not occur on the National Forest and do not identify project-related negative impacts that would result from implementation.*

**DA-Attachment 1-F** Citations advocating multiple use management

Timber Harvest Opposing View #7 - "The timber harvest shouldn't be dominant. It should be on an equal plane with recreation concerns, with wildlife concerns, hunting, fishing, protecting our cultural heritage. That's what the American public is asking us to do."

Dombeck, Mike Ph.D. "Through the Woods"
The News Hour with Jim Lehrer. 19 June 1998.
http://www.pbs.org/newshour/bb/fedagencies/jan-june98/road_6-19.html

Timber Harvest Opposing View #8 - "I recently read a letter from a line officer who chided local managers for being behind schedule relative to meeting the region's 'timber targets.' My expectation is that line officers will demand similar accountability for meeting watershed restoration, fish and wildlife habitat, riparian, recreation, cultural resource, and wilderness management goals."

"We need to do a better job talking about, and managing for, the values that are so important to so many people. Values such as wilderness and roadless areas, clean water, protection of rare species, old growth forests, naturalness -- these are the reasons most Americans cherish their public lands."

"Fifty years ago, Aldo Leopold wrote his seminal work, A Sand County Almanac. In it, Leopold spoke of his personal land ethic and the need for land managers to extend their own ecological conscience to resource decisions. The Forest Service natural resource agenda is an expression of our agency's land ethic. If we are to redeem our role as conservation leaders, it is not enough to be loyal to the Forest Service organization. First and foremost, we must be loyal to our land ethic. In fifty years, we will not be remembered for the resources we developed; we will be thanked for those we maintained and restored for future generations."

Dombeck, Mike Ph.D.
a message on "Conservation Leadership" sent to all USFS employees on July 1, 1998
http://www.wvhighlands.org/VoicePast/VoiceAug98/Dombeck.Aug98.html

Timber Harvest Opposing View #20 - "For too long, we foresters took the public for granted, assuming unwavering support for those who grow the nation's wood fiber. Few noticed when the public's mood changed, and those who did were often ridiculed by disbelieving colleagues. Now we come to a day of reckoning: the public believes forests are too important to be entrusted to foresters. To restore lost confidence, foresters must first come out of hiding. We have a lot of explaining to do because, where forests are concerned, the public will no longer support what it cannot see and understand. Regaining the public's trust will take time. We must be prepared to answer hard

questions about what we are doing and how our actions are impacting the environment. We must also help the public think through its forest management options. When we lay out these options, we must speak of much more than trees. Only then will our critics know we love forests as much as they do."

Houston, Alan Ph.D., "Why Forestry is in Trouble with the Public." Evergreen magazine, October 1997. http://evergreenmagazine.com/web/Why_forestry_is_in_trouble_with_the_public-v2.html

Timber Harvest Opposing View #39 - "In hopes of ending conflicts over "multiple use," an independent scientific committee has proposed that "ecological sustainability" should become the principal goal in managing the U.S. national forests and grasslands, which since 1960 have been under a congressional mandate to serve industry, recreation, and conservation all at once."

Mann, Charles C. Ph.D. and Mark L. Plummer Ph.D. "Call for 'Sustainability' in Forests Sparks a Fire" Science 26 March 1999: Vol. 283. no. 5410, pp. 1996 – 1998 http://www.sciencemag.org/content/283/5410/1996.summary

Timber Harvest Opposing View #67 - "The development of sound forest-management policies requires that consideration be given to the economic benefits associated with competing uses of forest resources. The benefits that may be provided under different management regimes include both use values (such as those provided by timber harvesting and recreation) and passive-use (or nonuse) values, including existence value, option value and quasi-option value. Many of these benefits are not revealed in market transactions, and thus cannot be inferred from conventional data on prices and costs."

Vincent, James W. Ph.D., Daniel A. Hagen, Ph.D., Patrick G. Welle Ph.D. and Kole Swanser. 1995. Passive-Use Values of Public Forestlands: A Survey of the Literature. A study conducted on behalf of the U.S. Forest Service. http://www.icbemp.gov/science/vincent.pdf

***Response***: *Multiple use management for the Forest Service is required by the Multiple Use Sustained Yield Act in addition to other legal and policy requirements. The references contain no statements that raise a dispute or present an adverse effect identified related to implementation of the proposed activities. Comments contain general statements that the Forest Service should adhere to multiple use management by making decisions that benefit ecosystems and the public, and that the Forest Service use the best available science when making those decisions. We agree that best available science should be used to develop and analyze the project, and feel that the use of the interdisciplinary team to develop and evaluate the project and the science used to develop and evaluate the effects of the project meet this criteria.*

*The public was involved throughout the scoping process and had opportunities to comment. The project was described in the Eldorado NF Schedule of Proposed Activities (SOPA), a public notice was placed in the Eldorado NF paper of record and in the Federal Register and letters were sent to interested parties. Several field trips to the project area were attended by scientists, members of the public and public organizations. Multiple, timely public comments were received that addressed the Blacksmith Project proposal and Draft EIS.*

**DA-Attachment 1-G** Citations that support proposed activities and analysis**.**

Timber Harvest Opposing View #11 - "The proposition that forest values are protected with more, rather than less logging, and that forest reserves are not only unnecessary, but undesirable, has great appeal to many with a vested interest in maximizing timber harvest. These ideas are particularly attractive to institutions and individuals whose incomes depend upon a forest land base. (page 2)"

"On the other hand, approaches that involve reserving of a portion of the land base, or harvest practices that leave commercially valuable trees uncut to achieve ecological goals, are often considered much less desirable as they reduce traditional sources of timber income. (page 2)"

Franklin, Jerry Ph.D., David Perry Ph.D., Reed Noss Ph.D., David Montgomery Ph.D. and Christopher Frissell Ph.D. 2000. "Simplified Forest Management to Achieve Watershed and Forest Health: A Critique." http://www.coastrange.org/documents/forestreport.pdf

Timber Harvest Opposing View #14 - "Most of the trees that need to be removed to reduce accumulated fuels are small in diameter and have little or no commercial value."

"Mechanically removing fuels (through commercial timber harvesting and other means) can also have adverse effects on wildlife habitat and water quality in many areas. Officials told GAO that, because of these effects, a large-scale expansion of commercial timber harvesting alone for removing materials would not be feasible. However, because the Forest Service relies on the timber program for funding many of its activities, including reducing fuels, it has often used this program to address the wildfire problem. The difficulty with such an approach, however, is that the lands with commercially valuable timber are often not those with the greatest wildfire hazards."

Government Accounting Office "Western National Forests: A Cohesive Strategy is Needed to Address Catastrophic Wildfire Threats" GAO/RCED-99-65 http://www.gao.gov/archive/1999/rc99065.pdf

Timber Harvest Opposing View #15 - "The recent concern over the poor health of western pine ecosystems has been attributed at least partly to inappropriate silvicultural practices, both before and since the national forests were established. (4) Because of the timber industry's needs, logging in mixed conifer stands has emphasized cutting the large pines and leaving the true firs and Douglas-fir to dominate the remaining stands. (5) However, true firs and Douglas-fir are more susceptible to the damage (including insect and disease attacks as well as direct damage) that has occurred during the decade-long drought in the interior West, and thus may contribute to the risk of catastrophic wildfires. Salvage sales are one tool that can be used to improve forest health, (6) but critics object to granting the agency the discretion to use timber sales to correct problems partially created by past timber sales."

Gorte, Ross W. Ph.D. "Forest Service Timber Sale Practices and Procedures: Analysis of Alternative Systems." A Congressional Research Service (CRS) report, October 30, 1995.

http://www.ncseonline.org/NLE/CRS/abstract.cfm?NLEid=215

Timber Harvest Opposing View #16 - “In April 1999, the General Accounting Office issued a report that raised serious questions about the use of timber sales as a tool of fire management. It noted that "most of the trees that need to be removed to reduce accumulated fuels are small in diameter" -- the very trees that have ‘little or no commercial value.’ “

“As it offers timber for sale to loggers, the Forest Service tends to ‘focus on areas with high-value commercial timber rather than on areas with high fire hazards,’ the report said. Its sales include ‘more large, commercially valuable trees’ than are necessary to reduce the so-called accumulated fuels (in other words, the trees that are most likely to burn in a forest fire).”

“The truth is that timber sales are causing catastrophic wildfires on national forests, not alleviating them. The Sierra Nevada Ecosystem Project Report, issued in 1996 by the federal government, found that ‘timber harvest, through its effects on forest structure, local microclimate and fuel accumulation, has increased fire severity more than any other recent human activity.’ The reason goes back to the same conflict that the G.A.O. found: loggers want the big trees, not the little ones that act as fuel in forest fires.”

“After a ‘thinning’ timber sale, a forest has far fewer of the large trees, which are naturally fire-resistant because of their thick bark; indeed, many of these trees are centuries old and have already survived many fires. Without them, there is less shade. The forest is drier and hotter, making the remaining, smaller trees more susceptible to burning. After logging, forests also have accumulations of flammable debris known as "slash piles" -- unsalable branches and limbs left by logging crews.”

Hanson, Chad Ph.D., “Commercial Logging Doesn't Prevent Catastrophic Fires, It Causes Them.” Published in the New York Times, May 19, 2000 http://www.commondreams.org/views/051900-101.htm

Timber Harvest Opposing View #23 - “In general, rate of spread and flame length were positively correlated with the proportion of area logged (hereafter, area logged) for the sample watersheds. Correlation coefficients of area logged with rate of spread were > 0.57 for five of the six river basins (table 5). Rate of spread for the Pend Oreille and Wenatchee River basins was strongly associated (r-0.89) with area logged. Correlation of area logged with flame length were > 0.42 for four of six river basins (table 5). The Deschutes and Methow River basins showed the strongest relations. All harvest techniques were associated with increasing rate of spread and flame length, but strength of the associations differed greatly among river basins and harvesting methods.” (pg.9)

“As a by-product of clearcutting, thinning, and other tree-removal activities, activity fuels create both short- and long-term fire hazards to ecosystems. The potential rate of spread and intensity of fires associated with recently cut logging residues is high, especially the first year or two as the material decays. High fire-behavior hazards associated with the residues can extend, however, for many years depending on the tree. Even though these hazards diminish, their influence on fire behavior can linger for up to 30 years in the dry forest ecosystems of eastern Washington and Oregon.”

Huff, Mark H. Ph.D.; Ottmar, Roger D.; Alvarado, Ernesto Ph.D. Vihnanek, Robert E.; Lehmkuhl, John F.; Hessburg, Paul F. Ph.D. Everett, Richard L. Ph.D. 1995. "Historical and current forest landscapes in eastern Oregon and Washington. Part II: Linking vegetation characteristics to potential fire behavior and related smoke production" Gen. Tech. Rep. PNW-GTR-355. USDA Forest Service, Pacific Northwest Research Station. https://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/4706/PB96155213.pdf;jsessionid=C8DDB611DB29D3716BBF313AADBA2E70?sequence=1

Timber Harvest Opposing View #27 - "Thus, the use of commercial logging for fire hazard reduction poses yet another paradox: Logging removes the trees that normally survive fires, leaves behind the trees that are most often killed by fire, increases flammable fuel loads, and worsens fire weather conditions." (pg. 5)

Ingalsbee, Timothy Ph.D. "The wildland fires of 2002 illuminate fundamental questions about our relationship to fire." The Oregon Quarterly, Winter 2002 http://fireecology.org/research/wildfire_paradox.pdf

Timber Harvest Opposing View #28 - "In the face of growing public scrutiny and criticism of the agency's logging policies and practices, the Forest Service and their enablers in Congress have learned to mask timber sales as so-called 'fuels reduction' and 'forest restoration' projects. Yet, the net effect of these logging projects is to actually increase fire risks and fuel hazards."

"Decades of encouraging private logging companies to take the biggest, oldest, most fire-resistant trees from public lands, while leaving behind a volatile fuel load of small trees, brush, weeds, stumps and slash has vastly increased the flammability of forestlands."

"In addition to post-fire salvage logging, the Forest Service and timber industry advocates in Congress have been pushing pre-fire timber sales, often falsely billed as hazardous fuels reduction or 'thinning' projects, to lower the risk or hazard of future wildfires. In too many cases, these so-called thinning projects are logging thick-diameter fire-resistant overstory trees instead of or in addition to cutting thin-sized fire-susceptible understory trees. The resulting logging slash and the increased solar and wind exposure can paradoxically increase the fuel hazards and fire risks."

Ingalsbee, Timothy Ph.D. "Fanning the Flames! The U.S. Forest Service: A Fire-Dependent Bureaucracy." Missoula Independent. Vol. 14 No. 24, June 2003 http://www.fire-ecology.org/research/USFS_fire_dependent.html

Timber Harvest Opposing View #29 - "More than any other recent human activity, the legacy of commercial timber extraction has made public forests more flammable and less resilient to fire. Firstly, clearcut and high-grade logging have historically taken the largest, most fire-resilient, most commercially-valuable trees, and left behind dead needles and limbs (logging debris called "slash"), along with smaller trees and brush that are less commercially valuable but more flammable than mature and old-growth trees. The net effect is to increase the amount of available hazardous fuel."

"Secondly, the removal of large overstory trees also changes the microclimate of logged sites, making them hotter, drier, and windier, which increases the intensity and rate of spread of wildfires. Third, the creation of densely-stocked even-aged plantations of young conifers made sites even more flammable since this produced a solid mass of highly combustible conifer needles within easy reach of surface flames. These changes in the fuel load, fuel profile, and microclimate make logged sites more prone to high-intensity and high-severity wildfires."

Ingalsbee, Timothy Ph.D. 2005. "A Reporter's Guide to Wildland Fire." Published by the Firefighters United for Safety, Ethics, and Ecology (FUSE), January 2005
http://www.commondreams.org/news2005/0111-14.htm

Timber Harvest Opposing View #31 - "History, not science, refutes the claim that logging helps to prevent forest fires.

The forests of the West are far more vulnerable to fire due to a century of industrial logging and fire suppression. Logging has removed most of the older, fire-resistant trees from the forests.

Fire suppression has encouraged many smaller and more flammable trees, brush and dense plantations to fill the holes. Logging has set the forests of the West up to burn big and hot.

More logging will not fix this."

Keene, Roy "Logging does not prevent wildfires" Guest Viewpoint, the Eugene Register Guard January 11, 2009 http://www.highbeam.com/doc/1G1-192070397.html

Timber Harvest Opposing View #35 - "The Congressional Research Service (CRS) recently addressed the effect of logging on wildfires in an August 2000 report and found that the current wave of forest fires is not related to a decline in timber harvest on Federal lands. From a quantitative perspective, the CRS study indicates a very weak relationship between acres logged and the extent and severity of forest fires. To the contrary, in the most recent period (1980 through 1999) the data indicate that fewer acres burned in areas where logging activity was limited."

"Qualitative analysis by CRS supports the same conclusion. The CRS stated: "[T]imber harvesting removes the relatively large diameter wood that can be converted into wood products, but leaves behind the small material, especially twigs and needles. The concentration of these fine fuels on the forest floor increases the rate of spread of wildfires." Similarly, the National Research Council found that logging and clearcutting can cause rapid regeneration of shrubs and trees that can create highly flammable fuel conditions within a few years of cutting."

Laverty, Lyle, USDA Forest Service and Tim Hartzell U.S. Department of the Interior "A Report to the President in Response to the Wildfires of 2000", September 8, 2000.
http://frames.nacse.org/6000/6269.html

Timber Harvest Opposing View #37 - “Those who would argue that this form of logging has any positive effects on an ecosystem are clearly misinformed. This type of logging has side effects related to wildfires, first and foremost being that the lumber companies aren't interested in hauling out all the smaller trees, branches, leaves, pine needles, sawdust, and other debris generated by cutting all these trees. All this debris is left on site, quickly dries out, and is far more flammable sitting dead on the ground than it was living in the trees. Smaller, non-commercially viable trees are left behind (dead) as well - creating even more highly flammable fuel on the ground.

Leitner, Brian. “Logging Companies are Responsible for the California Wildfires.” the Democratic Underground, October 30, 2003.
http://www.democraticunderground.com/articles/03/10/30_logging.html

Timber Harvest Opposing View #46 - "Agroforestry does reduce biodiversity. In forests used for logging, whole-landscape management is crucial. Here, emphasis is placed on areas of intensive use interspersed with areas for conservation and catchment purposes. Management strategies for sustainable forestry are being developed, but there is a need for further interaction among foresters, ecologists, community representatives, social scientists, and economists."

Noble, Ian R. and Rodolfo Dirzo Ph.D. "Forests as Human-Dominated Ecosystems." Science Vol. 277. No. 5325, pp. 522 - 525. 25 July 1997.
http://www.sciencemag.org/content/277/5325/522.abstract?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=logging&searchid=1136659907310_5043&FIRSTINDEX=0&journalcode=sci

Timber Harvest Opposing View #48 - “Still, forestry experts warned in the 2000 plan that logging should be used carefully and rarely; in fact, the original draft states plainly that the "removal of large merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk."

“Now, critics charge that the Bush administration is ignoring that warning. Neil Lawrence, a policy analyst with the Natural Resource Defense Council, claims that Washington has taken a far more aggressive approach to incorporating commercial logging in its wildfire prevention plans. As a result, Lawrence and other critics say, the National Fire Plan is becoming a feeding ground for logging companies. Moreover, critics claim the administration's strategy, far from protecting the lives and homes of those most at risk, could actually increase the likelihood of wildfires.”

Okoand Ilan Kayatsky, Dan. “Fight Fire with Logging?” Mother Jones, August 1, 2002
http://motherjones.com/politics/2002/08/fight-fire-logging

Timber Harvest Opposing View #63 - “The agency’s commercial timber program can contribute to the risk and severity of wildfire in the National Forests, yet Congress devotes nearly one-third of the Forest Service’s entire budget to this wasteful program.” (pg. 1)

“Do not utilize the commercial timber program to reduce the risk of fire. Commercial incentives undercut forest health objectives and can actually increase the risk of fire.” (pg. 9)

"Commercial logging, especially of larger, fire-resistant trees, in the National Forests is one of several factors contributing to the risk and severity of wildfire." (pg. 19)

"Commercial logging and logging roads open the forest canopy, which can have two effects. First, it allows direct sunlight to reach the forest floor, leading to increased evaporation and drier forests.5 As a consequence, ground fuels (grass, leaves, needles, twigs, etc.) dry out more quickly and become susceptible to fire. Second, an open canopy allows more sunlight to reach the understory trees, increasing their growth.6 This can lead to weaker, more densely-packed forests." (pgs. 19-20)

"Congress and the Forest Service continue to rely on the commercial logging program to do something it will never accomplish – reduce fire risk. The commercial logging program is designed to provide trees to private timber companies, not to reduce the risk of fire." (pg. 20)

Taxpayers for Common Sense. "Frorm the Ashes: Reducing the Harmful Effects and Rising Costs of Western Wildfires" Washington DC , Dec. 2000 http://www.ourforests.org/fact/ashes.pdf

Timber Harvest Opposing View #68 - "Unfortunately, there are number of massive logging proposals, disguised as hazardous fuels treatments, that have put environmentalists at odds with the Forest Service. Nearly all of these proposals focus primarily on the removal of mature and old-growth trees. These proposals continue even with overwhelming evidence that commercial logging is more of a problem than a solution. There's simply a cognitive disconnect between the Forest Service's scientists and its timber sale planners, whose budgets are dependent upon selling valuable mature trees.

Ironically, this very type of logging, experts inform us, is likely to increase, not decrease, the frequency and severity of wildland fires.

In the Forest Service's own National Fire Plan, agency scientists warned against the use of commercial logging to address fire management. The report found that 'the removal of large, merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk.' "

Voss, René. "Getting Burned by Logging," July 2002 The Baltimore Chronicle http://www.baltimorechronicle.com/firelies_jul02.shtml

Timber Harvest Opposing View #69 - "Another surprising finding is that mechanical fuels treatment, commonly known as logging and thinning, typically has little effect on the spread of wildfires. In fact, in some cases, it can increase wildfires' spread and severity by increasing the fine fuels on the ground (slash) and by opening the forest to greater wind and solar penetration, drying fuels faster than in unlogged forests."

Wuerthner, George. "Logging, thinning would not curtail wildfires" The Eugene Register-¬Guard, December 26, 2008 http://wuerthner.blogspot.com/2008/12/logging-thinning-would-not-curtail.html

***Response**: The 2004 Sierra Nevada Forest Plan Amendment provides desired conditions for land allocations. Land allocations include a network of Protected Activity Centers that provide for late seral habitat breeding habitat for identified Sensitive wildlife species. Goals for fire and fuels management include reducing threats to communities and wildlife habitat from large, severe wildfires and re-introducing fire into fire-adapted ecosystems. The Forest Plan decision includes managing hazardous fuels in and around communities combined with strategic placement of fuels treatments across broad landscapes to modify wildland fire behavior. The desired conditions for the project area and the need for treatment to move landscapes toward that condition were based upon direction in the Forest Plan.*

*We do not dispute that commercial logging without treatment of surface and ladder fuels has the potential to increase fire severity and intensity. See response to DA-Attachment 1-C. The project is designed to treat non-commercial surface and ladder fuels along with commercial tree removal. The citations support the proposed activities, which include treatment of surface and ladder fuels to reduce fire severity, preferred retention of larger, more resistant individual trees and retention of more resistant and resilient species of trees. Removal of trees is also proposed to meet elements of the purpose and need to restore a species composition and structure that is sustainable into the future. This Blacksmith Project's Purpose and Need is to perpetuate the sustainability and fire resiliency of the large and oldest trees that are present upon the landscape. The Design Criteria specifically identifies the retention of large trees upon the landscape as an element in all action alternatives.*

*The Franklin citation from 2000 primarily refers to the forest reserves established by the Northwest Forest Plan. "Forest Reserves" per se are not an element in the management of the National Forests in the Sierra Nevada. It is beyond the scope of the Blacksmith EIS to address the value or need for forest reserves. The Blacksmith Project design criteria does include the retention of the larger, commercially valuable trees and excludes operations within spotted owl and goshawk protected activity centers, sensitive plant populations and addresses riparian area conservation goals in an effort to achieve multiple ecological goals.*

*The quoted text from Nobel et al (1997) is from the document's abstract but is missing a key clause. The full text is: "Agroforestry does reduce biodiversity, but it can also act as an effective buffer to forest clearance and conversion to other land uses, which present the greatest threat to forested ecosystems. In forests used for logging, whole-landscape management is crucial. Here, emphasis is placed on areas of intensive use interspersed with areas for conservation and catchment purposes. Management strategies for sustainable forestry are being developed, but there is a need for further interaction among foresters, ecologists, community representatives, social scientists, and economists." Sustainable management of national forests is required by National Forest Management Act and Multiple Use Sustained Yield Act. The Blacksmith Project Purpose and Need includes the objective of increasing biodiversity and restoration of healthy ecological conditions within the project area.*

**DA-Attachment 1-H** Citations of opinions regarding funding allocations and methods

Timber Harvest Opposing View #15 - "A more general concern in some quarters is over Forest Service "bias" toward timber outputs, at the expense of ecosystem conditions and other resource values. While timber harvests are important, other important values are not measured, and managers

are not rewarded for achieving these other values. (7) Some have attributed this "bias" to inappropriate incentives, particularly related to the agency's numerous trust funds and special accounts. (8) The Forest Service has several trust funds and special accounts that are either funded by timber revenues or provide funds for timber management (or both). (9)"

"One trust fund often cited by critics is the Knutson-Vandenberg (K-V) Fund. This account receives an unlimited portion of timber sale receipts, to be used for reforestation, timber stand improvements, and other resource mitigation and enhancement activities in timber sale areas. Forest Service managers can, therefore, fund their programs from timber sales; in the words of one critic, wildlife managers have an incentive to support timber sales that damage wildlife habitat, because they can use the revenues to mitigate that damage and to keep themselves and their staffs employed. (10)"

Gorte, Ross W. Ph.D. "Forest Service Timber Sale Practices and Procedures: Analysis of Alternative Systems." A Congressional Research Service (CRS) report, October 30, 1995. http://www.ncseonline.org/NLE/CRS/abstract.cfm?NLEid=215

Timber Harvest Opposing View #17 - "The Forest Service keeps the vast majority of timber sale revenues, which gives it a perverse incentive to do more cutting. It has developed a huge bureaucracy around the selling of timber from national forest land."

Hanson, Chad, Ph.D. "Logging for Dollars in National Forests" Special to The Sacramento Bee - November 14, 2001/ http://www.johnmuirproject.org/news-logging-for-dollars.html

Timber Harvest Opposing View #45 - "As a result of the Forest Service's well-documented mismanagement over many years of the timber sale program, taxpayers also have been stuck with the tab for hundreds of millions of dollars worth of subsidies to a profitable timber industry."

Nappier, Sharon. Lost in the Forest: How the Forest Service's Misdirection, Mismanagement, and Mischief Squanders Your Tax Dollars. Taxpayers for Common Sense, 2002. http://www.ourforests.org/fact/lostintheforest.pdf

***Response:*** *Funding of the Forest Service and use of trust funds is governed by annual appropriations enacted by Congress. Other laws passed by Congress including use of stewardship authorities and the Knudsen-Vanderburg trust fund allow the Forest Service to plan for additional non-commercial activities within the bounds of the legislation without having to rely on annual appropriations. Opinions regarding funding appropriations from Congress are beyond the scope of project analysis. Stewardship authorities are not used for funding employee salaries. Any funds collected on the Blacksmith Project would be handled in accordance with national policy, law and regulation.*

**DA-Attachment 1-I** Citations involving opinions on legislation and policy related to logging on National Forest System lands.

Timber Harvest Opposing View #24 - "The Quincy Library Group's (QLG's) fuelbreak strategy represents a giant step backwards from the progressive development of rational fire policies established by the 1995 Federal Wildland Fire Management Policy and Program Review."

"The fact that the QLG admits that its Plan is inconsistent with these new policies (indeed, is almost gleefully defiant of them) says a lot about the credibility of the QLG's self-purported fire management expertise."

"In spite of (or more likely because of) the intensive 'fuels reduction' activities associated with commercial logging, the Fountain Fire was truly catastrophic in its effects."

"Even 'kinder, gentler' commercial logging still inflicts environmental impacts such as eroded topsoil, degraded water quality, destroyed wildlife habitat, and extirpated species that are every bit as much symptoms of forest health problems as large-scale, severe wildfires."

"And after spending millions of dollars creating the SNEP Report, it seems wise to use its information, not ignore it or opportunistically select out statements clearly worded as assumptions, values, or goals which run contrary to factual research findings. The QLG Plan has much more to do with timber extraction than with genuine fire protection, and in that respect, it constitutes more of a forest health threat than a real solution."

"The QLG Bill resembles similar 'panic legislation' that was passed during the early 1970s in which, following some large-scale wildfires in California, Congress allowed the Forest Service to access emergency firefighting funds to conduct 'presuppression' timber sales. Many fuelbreaks were cut in the Sierras during this period, and while costs rapidly rose into tens of millions of dollars, most of these fuelbreaks failed to perform adequately during wildfire suppression incidents. Congress quickly had to take away this funding source from the Forest Service. What has become of these old fuelbreaks? Almost without exception, the agency failed to monitor or maintain them, and in a modern-day version of 'cut and run' logging, many of these old fuelbreaks have converted to chaparral brush and 'dog-hair' thickets a much more flammable vegetation type than the original forest cover. The QLG Bill appears to be 'deja vu' without evidence of Congress or the QLG being aware of this history of previous fuelbreak programs."

Ingalsbee, Timothy Ph.D. "Logging for Firefighting: A Critical Analysis of the Quincy Library Group Fire Protection Plan." Unpublished research paper. 1997.
http://www.fire-ecology.org/research/logging-for-firefighting_2.htm

Timber Harvest Opposing View #52 - “Less than 5% of America's original forests remain, and these forests are found primarily on federal lands. Logging in the last core areas of biodiversity is destroying the remaining intact forest ecosystems in the United States. At the current rate of logging, these forests and their priceless biological assets will be destroyed within a few decades.

We urge Congress to pass the Act to Save America's Forests. It is the first nationwide legislation that would halt and reverse deforestation on all our federal lands. By implementing protective measures

based on principles of conservation biology, the bill provides a scientifically sound legislative solution for halting the rapid decline of our nation's forest ecosystems.

The Act to Save America's Forests will:

- Make the preservation and restoration of native biodiversity the central mission of Federal forest management agencies.
- Ban extractive logging in core areas of biodiversity and the last remnant original forest ecosystems: roadless areas, ancient forests and special areas of outstanding biological value.
- Protect sensitive riparian areas and watershed values by banning extractive logging in streamside buffer zones.
- End clearcutting and other even age logging practices on federal land.
- Establish a panel of scientists to provide guidance to federal forest management.

We believe it is our professional responsibility to ask Congress to align Federal forest management with modern scientific understandings of forest ecosystems. Passage of the Act to Save America's Forests will give our nation's precious forest ecosystems the best chance or survival and recovery into the 21st century and beyond."

Raven, Peter, Ph.D., Jane Goodall, C.B.E., Ph.D., Edward O. Wilson, Ph. D.
and over 600 other leading biologists, ecologists, foresters, and scientists from
other forest specialties. From a 1998 letter to congress.
http://www.saveamericasforests.org/resources/Scientists.htm

Timber Harvest Opposing View #53 - "The Act to Save America's Forests is based on the principles of conservation biology. It would make the protection native biodiversity the primary goal of federal forest management agencies. The bill would protect over 20 million acres of core forest areas throughout the nation, including ancient forests, roadless areas, key watershed, and other special areas. It is a comprehensive, sustainable, and ecologically-sound plan for protecting and restoring the entire federal forest system.

If the current pace of logging planned by the Forest Service continues, nearly all of America's ancient and roadless wild forests will soon be lost forever. According to a recent report by the World Resources Institute, only one percent of the original forest cover remains in large blocks within the lower 48 states. The Act to Save America's Forests incorporates the solution recommended by the report, namely to protect core forest areas from any logging and to allow sustainable forest practices around these protected forests. Endorsed by over 600 leading scientists, this bill may be the last hope for America's forests."

Raven, Peter, Ph.D., from his February 9, 2001 letter to Senator Jean Carnahan
http://www.saveamericasforests.org/Raven.htm

Timber Harvest Opposing View #47 - "The U.S. Forest Service has been sitting on a public opinion survey it commissioned, not knowing what to do with the results. The problem is that most people surveyed want more wilderness and less logging on the Green Mountain National Forest (GMNF), while the federal agency seems to want to build more roads and cut more trees."

"The survey conducted by Dr. Robert Manning of the School of Natural Resources at the University of Vermont, polled 1,500 Vermont households in the spring of 1995. A survey with similar results was completed last fall for the White Mountain National Forest in New Hampshire. 'It is clear that New England residents value the national forest for many reasons, but non-material values, such as aesthetics and ecological protection, are more important than material values, such as economic development,' said Dr. Manning."

"The responses to several survey questions indicate a strong public desire for more areas of wild, untouched nature on the GMNF and less roadbuilding and logging. Very few people supported clearcutting and other types of industrial logging, especially if natural beauty or wildlife habitat were harmed."

"For example:

- 82 percent wanted to ban clearcutting,
- 82 percent said logging should not hurt scenic beauty,
- 80 percent of the respondents wanted to protect remaining undisturbed forest; and
- 72 percent urged prohibition of logging if bear or other wildlife habitat would be harmed."

"Only 36 percent felt that management of the GMNF should emphasize timber and lumber products; and only 15 percent felt that jobs are more important than protection of endangered species."

"'The results of this survey and a similar one on the White Mountain National Forest in Vermont should serve as loud wake-up calls to the U.S. Forest Service,' said Northup. 'Forest Service officials have two choices: either begin a major overhaul of the agency's management programs or ignore the wishes of the people they are supposed to serve'."

Northup, Jim. 1999. "Public Wants More Wilderness, Less Logging on Green Mountain NF". Press Release by Forest Watch, a Vermont-based environmental organization. http://www.forestwatch.org/content.php?id=10

Timber Harvest Opposing View #58 - "Within this volatile atmosphere the Bush Administration presented a new proposal for fire prevention called the "Healthy Forest Initiative." The plan received wide coverage in the national media in August and September 2002 and continues to be at the center of an attempt to significantly shift public land management in the United States. At the core of the plan is an effort to create private sector incentives to promote logging/thinning projects in the national forests."

Short, Brant, Ph.D. and Dayle C. Hardy-Short Ph.D. "Physicians of the Forest": A Rhetorical Critique of the Bush Healthy Forest Initiative" Electronic Green Journal, Issue #19, December 2003 http://escholarship.org/uc/item/4288f8j5

Timber Harvest Opposing View #61 - "In sum, 100 years of fire suppression and logging have created conditions that threaten central Oregon's natural resources and communities."

"Thus it is inexplicable that the solution proposed by President Bush and some members of Congress emphasizes fire suppression and commercial logging, the very practices that created today's crisis. The federal government continues to attempt to suppress over 99% of all wildland fires. The Forest Service continues to measure its success not in terms of ecosystems restored, but in fires put out. The President's Healthy Forest Initiative, as embodied in H.R. 1904, promotes commercial logging at the expense of citizen participation and oversight of the forests we own."

Stahl, Andy. "Reducing the Threat of Catastrophic Wildfire to Central Oregon Communities and the Surrounding Environment." Testimony before the House Committee on Resources, August 25, 2003 http://www.propertyrightsresearch.org/2004/articles6/testimony_of_andy_stahl.htm

**Response:** *Addressing issues concerning federal legislation and national policy are beyond the scope of this project; however, the Blacksmith Project is responsive to many of the underlying concerns expressed by supporters of the cited bill. This project does not include clearcutting, protects sensitive riparian areas to ensure riparian functions, and will not adversely affect ancient forests, roadless areas, or special area of outstanding biological value as identified in the Eldorado NF Forest Plan.*

*The relevance to the Blacksmith Project to a survey conducted in 1999 about forests in Vermont is not clear. The Blacksmith Project has been made available to the public via local paper, letters to the public, the Eldorado NF's Schedule of Proposed Activities and public notification in the Federal Register. Public responses as a result of this public notification effort are clearly more site specific than those noted in the above survey.*

*The project area is not in the Quincy Library Group (QLG) area and is not part of the Green Mountain National Forest. QLG legislation is not relevant to the management of the Eldorado National Forest. The Blacksmith Project was designed and would be implemented using current laws, policies and regulations.*

**DA-Attachment 1-J** Citations relative to impacts of past activities**.**

Timber Harvest Opposing View #22 - "Human tampering with nature has not been without costs. Human manipulation of existing ecosystems has also sometimes had unfortunate consequences."

Hudak, Mike Ph.D. "From Prairie Dogs to Oysters: How Biodiversity Sustains Us" from his book review of The Work of Nature: How the Diversity of Life Sustains Us by Yvonne Baskin, 1997 Newsletter of Earth Day Southern Tier, February/March 1999, p. 2 *http://www.mikehudak.com/Articles/FromPrairieDogs9902.html*

Timber Harvest Opposing View #25 - "The notion that commercial logging can prevent wildfires has its believers and loud proponents, but this belief does not match up with the scientific evidence or history of federal management practices. In fact, it is widely recognized that past commercial logging, road-building, livestock grazing and aggressive firefighting are the sources for "forest health" problems such as increased insect infestations, disease outbreaks, and severe wildfires."

"How can the sources of these problems also be their solution? This internal contradiction needs more than propaganda to be resolved. It is time for the timber industry and their supporters to heed the facts, not fantasies, and develop forest management policies based on science, not politics."

Ingalsbee, Timothy Ph.D. 2000. "Commercial Logging for Wildfire Prevention: Facts Vs Fantasies" http://www.fire-ecology.org/citizen/logging_and_wildfires.htm

Timber Harvest Opposing View #65 - "Timber harvest, through its effects on forest structure, local microclimate, and fuels accumulation, has increased fire severity more than any other recent human activity."(pg.62)

University of California; SNEP Science Team and Special Consultants 1996 "Sierra Nevada Ecosystem Project: Final Report to Congress" Volume 1, Chapter 4 – Fire and Fuels. http://ceres.ca.gov/snep/pubs/web/PDF/v1_ch04.pdf

Timber Harvest Opposing View #72 - "As conservation-minded scientists with many years of experience in biological sciences and ecology, we are writing to bring your attention to the need to protect our National Forests. Logging our National Forests has not only degraded increasingly rare and valuable habitat, but also numerous other services such as recreation and clean water."

"Unfortunately, the past emphasis of management has been on logging and the original vision for our National Forests has failed to be fully realized. During the past several decades, our National Forests have suffered from intense commercial logging. Today almost all of our old growth forests are gone and the timber industry has turned our National Forests into a patchwork of clearcuts, logging roads, and devastated habitat."

"It is now widely recognized that commercial logging has damaged ecosystem health, clean water, and recreational opportunities-- values that are highly appreciated by the American public. The continued logging of our National Forests also wastes American tax dollars and diminishes the possibilities of future economic benefits. The Forest Service and independent economists have estimated that timber accounts for only 2.7 percent of the total values of goods and services derived from the National Forests, while recreation and fish and wildlife produce 84.6 percent."

From an April 16, 2002 letter to President Bush asking him to stop all logging in the national forests. http://www.forestwatch.org/content.php?id=108

The names of the 221 Ph.D. level scientists that signed the letter are included in the attachment. Over half are college professors. The Responsible Official ignores the statements of 221 unbiased, highly educated biological scientists who point out the common natural resource degradation resulting from commercial timber sales based on the word of a handful of foresters and silviculturists who will gain personally when the timber sale is sold. Clearly, the Responsible Official prefers to let representatives from resource extraction corporations choose the projects on the forest.

***Response:*** *Cumulative effects analysis were carried out in accordance with 40 CFR 1508.7 and in accordance with The Council on Environmental Quality Guidance Memorandum on Consideration of Past Actions in Cumulative Effects Analysis dated June 24, 2005.*

The *Blacksmith EIS provides a detailed analysis of the potential effects of actions in order to allow the deciding official to make an informed decision. Project design criteria provide the basis for our effects analyses. The analyses, using best available science, conclude that effects from proposed actions would not be significant. The Blacksmith EIS cites peer reviewed research papers and site specific, professional reports to support the environmental effects analysis of the proposed activities.*

*The Blacksmith EIS recognizes that logging may increase short-term fire risks, but planned whole tree yarding and treatment of activity generated fuels and natural fuels would effectively limit logging slash, reducing the intensity of follow-up burns and natural fires. Harvest prescriptions would emphasize retention of old trees that prior to the era of fire suppression persisted and thrived under open forest conditions with frequent low intensity fires. Even though the rate of fire spread may increase in treated stands (due to drying of fast-burning fuels), fire intensity and fire severity would be reduced. The risk of uncharacteristic fire would be reduced (Blacksmith fuels report).*

*The references do not contain any statements that raise a dispute or present an adverse effect identified related to implementation of the proposed activities. Comments are directed at effects caused in the past from past activities. There is a marked difference between past and current land management practices and policies. The evolution that has occurred in land management practices is the result of science and our ongoing monitoring actions. Most logging before 1900 occurred at low elevations on lands adjacent to mines. Wagons were the primary means of transporting timber. Partially cut lands, especially those more distant from Placerville were largely exploited for the shake market, which were produced from the choicest sections of the bole of sugar pine. Usually no more than 40 percent of the individual sugar pine tree would be used for shakes. During the first half of the twentieth century, the Forest Service was given responsibility for millions of acres of forests that had not been privatized before the 1890s. The Forest Service provided fire protection, policing against poor resource utilization, and expansion of the road infrastructure for future use. The Eldorado National Forest was created on July 28, 1910 from parts of the Tahoe and Stanislaus National Forest by Proclamation of President Taft. The earlier Forest Reserves date from 1897 for the Stanislaus and 1899 for the Tahoe. Early harvests emphasized cheap, labor intensive logging methods such as railroad transportation systems, horse logging, short distance jammer systems, and tractor logging. Logging systems were selected primarily by the least expensive method to transport trees from the forest to the mill. This sometimes involved harvesting on steeper slopes, creating excessive soil disturbance and increasing the risk of erosion. Streams were sometimes used as a method to transport logs from harvest sites, causing impacts to the aquatic system and adjacent riparian habitat.*

*In contrast, proposed timber harvest activities include the use of Best Management Practices, differing silvicultural prescriptions, and improved harvest techniques. Best Management Practices (BMPs) are measures certified by the State Water Quality Board and approved by the Environmental Protection Agency (EPA) as the most effective way of protecting water quality from impacts stemming from non-point sources of pollution. These practices have been applied in timber sales and road construction projects in watersheds over the last 20 years and have been found to be effective in protecting water*

*quality within the Eldorado National Forest. Specifically, effective application of the R-5 U.S. Forest Service BMPs have been found to maintain water quality in conformance with the Water Quality Objectives for the Central Valley Regional Water Quality Control Board. The Region 5 Forest Service BMPs have been monitored and modified since their original implementation in 1979 to make them more effective. The Forest monitors the implementation and effectiveness of BMPs on randomly selected projects each year. The full list of BMPs is available for review in USDA Forest Service. 2012. National Best Management Practices for Water Quality Management on National Forest System Lands. Volume 1: National Core BMP Technical Guide. FS-990a.*

*Many of the management concepts discussed in An Ecosystem Strategy for Sierran Mixed-Conifer Forests (North et al. 2009), published as GTR 220 and An Ecosystem Management Strategy for Sierran Mixed-Conifer Forests published as GTR 237, are incorporated into the Blacksmith project silvicultural prescriptions. Timber harvest prescriptions and design for this project emphasize desired conditions of the forest after harvest. This would result in the retention of trees in a post-harvest stand addressing objectives that include wildlife habitat, watershed conditions, hazardous fuels, visual quality, soil productivity, forest health and others. Some examples where timber production and resource objectives can be achieved simultaneously are:*

- *Reducing tree densities to decrease bark beetle hazard, thereby prolonging the development of the forest and maintaining tree cover;*
- *Managing tree canopies to limit fire spread from the forest floor to the tree crowns;*
- *Increasing the amount of ponderosa pine and sugar pine, which generally are insect and disease, and drought resistant and are long-lived.*
- *Other elements of modern harvest prescriptions that address specific resource objectives include:*
    - *Retention of snags for cavity nesters,*
    - *Retention of down wood for soil nutrition and wildlife habitat;*
    - *Maintaining sediment filtering vegetation near riparian areas, and*
    - *Maintaining vegetation diversity through hardwood retention and protection of rare plants.*

*Increased environmental awareness has led to improvements in logging systems that are used to remove trees from the forest. Today's logging systems recognize and reduce the threat of environmental harm in a number of ways. Tractor logging generally occurs on slopes 35% or less, and is limited to designated locations, reducing soil impacts. A number of Best Management Practices and Forest Plan Standards and Guidelines guide the development of the least impacting design possible. Monitoring during and after the sale is completed provides a valuable feedback loop that identifies and corrects problems should they occur.*

**DA-Attachment 1-K** Use of terms**.**

Timber Harvest Opposing View #26 - "Since the 'New Perspectives' program of the early 1990s, the agency has tried to dodge public opposition to commercial logging by using various euphemisms, such as this gem from the Siskiyou National Forest: Clearcuts are called 'minimum green tree retention units.' Accordingly, Forest Service managers have believed that if they simply refer to logging as 'thinning,' or add the phrases 'fuels reduction' or 'forest restoration' to the title of their timber sale plans, then the public will accept these projects at face value, and business-as-usual commercial logging can proceed. In the face of multiple scandals and widespread public skepticism

of the Forest Service's credibility, it seems that only Congress is buying the agency's labeling scheme."

Ingalsbee, Timothy Ph.D. "Logging without Limits isn't a Solution to Wildfires" published in the Portland Oregonian, August 6, 2002
http://www.klamathforestalliance.org/Documents/loggingwithoutlimits.html

"We concluded that commercial timber sales do not meet the criteria for forest restoration."
Long, Richard D., U.S. Department of Agriculture Office of Inspector General "Western Region Audit Report: Forest Service National Fire Plan Implementation" Report No. 08601-26-SF, November 2001.
http://maps.wildrockies.org/ecosystem_defense/Resources_Species_Topics/Fire/Misuse%20of%20Fire%20Plan%20funds.pdf

***Response**: Commercial timber harvest "logging" covers a broad category of treatment types ranging from clearcuts to overstory removal treatment to hazard tree removal to thinning from below of small material and can even be used to describe the removal of a single tree if there is any economic revenue that results from the removal of the tree. Likewise if the same size material is removed, but not sold, it is not termed as commercial logging, but may have the same effects. Therefore we feel that an additional description of what is being proposed and why through use of terms like "thinning" to differentiate proposed activities from clearcutting and "fuels reduction" which incorporates a host of activities including non-commercial tree cutting, piling, pile burning, mastication, and prescribed fire are useful to clarify the proposed activities.*

*Conclusions that commercial timber sales do not meet the criteria for forest restoration were not based on scientific evidence or environmental effects but instead were a description of funds used to prepare for commercial timber sales on the Bitterroot National Forest. The projects on the Bitterroot National Forest include commercial timber sales as well as noncommercial thinning treatments. The National Forest planned to borrow NFP funds for these projects until it received the funding designated for this purpose. It was concluded that commercial timber sales do not meet the criteria for forest restoration. "According to the FS' FY 2002 Budget Justification, all costs associated with a timber sale (planning, preparing, and administering) are included in the Forest Products Budget Line Item of the National Forest System appropriation, except when the primary purpose of a timber sale is some other land management objective such as wildlife habitat improvement or hazardous fuels reduction." The Office of Inspector General went on to say "Our survey did not question the use of NFP rehabilitation and restoration program funding to fund the NEPA analysis performed pertaining to the projects in question. Rather, we questioned the Bitterroot National Forest's plans to use NFP rehabilitation and restoration program funds to fund the cost to prepare and administer these projects when the primary purpose of the projects may be a commercial timber sale."*

*Funds for the development and proposal of the project have been allocated through the project work plan using fuels reduction and forest health funds; therefore we feel that a comment on the use of National Forest rehabilitation and restoration program funding is not relevant to this project.*

**DA-Attachment 1-L** Effects not related to the proposed project

Timber Harvest Opposing View #1 - The following document contains pertinent color pictures showing logging damage, thus the article text is not shown here. Please use the link below to access the article.

Al-jabber, Jabber M. "Habitat Fragmentation: Effects and Implications" Clearcuts and forest fragmentation, Willamette NF, Oregon. From: Cascadia Wildland Project, Spring 2003 http://faculty.ksu.edu.sa/a/Documents/Habitat%20Fragmentation%20Effects%20and%20Implication.pdf

Timber Harvest Opposing View #30 - "Linear developments may result in habitat avoidance for grizzly bears. Logging-truck traffic in the Kimsquit Valley in British Columbia resulted in a 78% reduction in use of the "Zone of Hauling Activity" by radio collared bears compared to non-hauling periods (16). For 14 hours/day, 3%-23% of each bear's home range was unavailable to them because of disturbance."

"The impacts of land-use activities on wolverines are likely similar to those on grizzly bears. Wolverines seem to have been most affected by activities that fragment and supplant habitat, such as human settlement, extensive logging, oil and gas development, mining, recreational developments, and the accompanying access. Wolverine populations that are now at the edge of extirpation have been relegated to the last available habitat that has not been developed, extensively modified, or accessed by humans."

Jalkotzy, M.G., P.I. Ross, and M.D. Nasserden. 1997. "The Effects of Linear Developments on Wildlife: A Review of Selected Scientific Literature." Prepared for Canadian Association of Petroleum Producers. Arc Wildlife Services Ltd., Calgary. 115pp. http://www.capp.ca/getdoc.aspx?DocId=24902&DT=PDF

Timber Harvest Opposing View #55 - "I will discuss my views on how activities related to timber harvest adversely affect coastal salmonids in California by destroying, altering, or otherwise disturbing the freshwater habitats upon which these fish depend during crucial phases of their life cycle. I base these opinions on my research and observations in the field, as well as my review of and familiarity with the scientific literature and publications of government agencies, commissions, and scientific review panels. Below I discuss in some detail the life history and habitat needs of coho salmon to illustrate how timber harvest and related roads affect this threatened species. Although Chinook salmon and steelhead trout have similar life histories and habitat needs, and also are negatively affected by timber harvest, I will use coho salmon in my discussion."

"Loss or degradation of stream habitat has been and remains the single most significant cause of the decline of anadromous salmonids in general in the Pacific Northwest. In my experience the most pervasive and severe impacts to coastal watersheds in California inhabited by coho salmon result from logging and associated activities. These activities cause significant alteration and degradation to coho salmon habitat by 1) increasing sediment input to salmon bearing streams and their tributaries: 2) by decreasing input of LWD into waterways; 3) by altering streamflow regimes, increasing the

likelihood of scouring flows and flooding; and 4) by increasing water temperatures. These pervasive changes due to timber harvest decrease the complexity and suitability of coho salmon habitat, including adversely affecting insects and other organisms that provide food for fish."

Roelofs, Terry D. Ph.D. Testimony for the California State Water Board and Regional Water Quality Control Boards Regarding Waivers of Waste Discharge Requirements on Timber Harvest Plans. August 2003.
http://webcache.googleusercontent.com/search?q=cache:QNy_aih1RxEJ:edennapa.org/thp/roelofstestimony.doc+%22timber+harvest%22+ph.d.+adverse&hl=en&ct=clnk&cd=5&gl=us

Timber Harvest Opposing View #57 - "Once clear-cutting has occurred, regulation and human silvicultural practices become responsible for the revegetation that follows. The creation of new forest succession patterns are the result of human control over the growing environment. Rather than proceeding at a natural pace, humans attempt to speed up the forest succession process to quickly return to a situation where harvesting is again possible. Reforestation of the disturbed area after clear-cutting also emphasizes maintaining control over the distribution and quality of forest species.

Simplification is a state that results from the forest being harvested before it reaches maturity. Logging simplifies forest ecosystems (Dudley et al 1995) by narrowing the age range of the stand and suppressing diversification through repeated harvesting, burning to remove slash, and replanting with hybrid seedlings. Simplification affects the health and productivity of the forest because simplified forests lack the variety found in older stands, including species diversity, vertical structure, and microhabitat. From an ecological standpoint, a simplified forest of a particular age has less overall bio-mass per acre than a natural forest of the same age, but a simplified forest produces a higher volume of merchantable timber.

Scott, Mark G. "Forest Clearing in the Gray's River Watershed 1905-1996" A research paper submitted in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in GEOGRAPHY Portland State University, 2001 http://www.markscott.biz/papers/grays/chapter1.htm

Timber Harvest Opposing View #62 - "Fire, just like insects and disease, are a natural and beneficial part of forest ecosystems and watersheds. Without these natural processes the forest ecosystems quickly degrade. Excessive logging removes and reduces cooling shade adding to the hotter, drier forests along with logging debris creating a more flammable forest. Current "forest management" practices, road building and development cause forest fires to rage for hundreds of miles.

The Sierra Nevada Ecosystem Project said in a report to the U.S. Congress that timber harvests have increased fire severity more than any other recent human activity. Logging, especially clear cutting, can change the fire climate so that fires start more easily, spread faster, further, and burn hotter causing much more devastation than a fire ignited and burned under natural conditions. If we stop the logging and stop building fire prone developments, we minimize the loss of lives and property suffered by people in fires.

As long as the people of America let politicians, timber executives, and the Forest Service get away with it - it will not stop. Those corporations that profit will continue to lie, cheat and steal to continue to make more money from our losses. Just like big tobacco."

Strickler, Karyn and Timothy G. Hermach, "Liar, Liar, Forests on Fire: Why Forest Management Exacerbates Loss of Lives and Property" Published by CommonDreams.org, October 31, 2003 http://www.commondreams.org/scriptfiles/views03/1031-10.htm

Timber Harvest Opposing View #60 - "Timber harvesting in British Columbia influences (a) forest hydrology; (b) fluvial geomorphology; (c) terrain stability; and (d) integrated watershed behavior. Impacts on forest hydrology are well understood and include increased average runoff, total water yield, increased storm runoff and advances in timing of floods. Stream channels and valley floors are impacted differently by fine sediment, coarse sediment and large woody debris transport. Terrain stability is influenced through gully and mass movement processes that are accelerated by timber harvesting. Impacts on integrated watershed behavior are assessed through disturbed sediment budgets and lake sediments."

Slaymaker, Olav Ph.D. "Assessment of the Geomorphic Impacts of Forestry in British Columbia" AMBIO: A Journal of the Human Environment 29(7):381-387. 2000 http://www.bioone.org/doi/abs/10.1579/0044-7447-29.7.381

Timber Harvest Opposing View #71 - "After logging, peak pipeflow was about 3.7 times greater than before logging."

"The use of heavy logging equipment was expected to compact the soil, reduce infiltration rates, and increase surface runoff. In addition, heavy equipment might collapse some of the subsurface pipes, increasing local pore water pressure and the chance of landslides (Sidle, 1986)."

Ziemer, Robert R. Ph.D., "Effect of logging on subsurface pipeflow and erosion: coastal northern California, USA." Proceedings of the Chengdu Symposium, July 1992. IAHS Publication. No. 209, 1992 http://www.fs.fed.us/psw/publications/ziemer/Ziemer92.PDF

Timber Harvest Opposing View #34 - "Among these four species of amphibians, the spotted salamander is most likely to be affected adversely by the logging as this species of salamander relies on dense forests with full canopies (Harding, 1997)."

"Looking at the study on a larger scale, the potential for changes caused by logging is great. Absence of trees could influence water temperature by altering available sunlight, conductivity by changing the amount of organic matter that collects in the vernal ponds, or pH if the logging process deposits foreign residues to the area. Also heavy equipment used to harvest the timber has the potential to alter the terrain."

"Modifications to the landscape could change how water flows and collects at the surface and change the size, shape, and location of the vernal ponds. Loss or alteration to small temporary water sources

less than four hectares can be extremely detrimental to amphibians water (Semlitsch, 2000). Without vernal ponds amphibians would have difficulty inhabiting forested areas because they rely on the ponds as breeding grounds. If logging disturbs the ponds, amphibian populations could diminish in the areas that surround these vernal pools."

Klein, Al 2004. Logging Effects on Amphibian Larvae Populations in Ottawa National Forest. http://www.nd.edu/~underc/east/education/documents/AKlein2004Pre-loggingsurveyofamphibianlarvaeinvernalpools.pdf

Timber Harvest Opposing View #42 - "In addition to the direct effects of habitat loss and fragmentation, logging typically reduces ecosystem health by: a) damaging aquatic habitats through siltation, reduction in stream complexity and increased water temperatures."

McIntosh, B.A., J.R. Sedell, J.E. Smith, R.C. Wissmar S.E. Clarke, G.H. Reeves, and L.A. Brown "Management history of eastside ecosystems: changes in fish habitat over 50 years, 1935-1992." 1994 GTR-321 93-181 http://www.fs.fed.us/pnw/publications/pnw_gtr321/

***Response:*** *The referenced literature discusses effects from clear cutting, which is not proposed on the Blacksmith Project.*

*Forest Service Manual (FSM) 2672.42 directs that a biological assessment (BA) be prepared for all proposed projects that may have effects upon federally proposed, threatened, and endangered species to ensure that project decisions do not adversely affect federally listed species. In addition, FSM 2670.32 directs that a biological evaluation (BE) be prepared to evaluate the effects of proposed projects on Forest Service Region 5 designated sensitive species to ensure that project decisions do not result in the loss of species viability or create significant trends towards federal listing. Wildlife reports for the project analyze the potential effects of the proposed project for federally listed threatened, endangered, and proposed terrestrial species, and Region 5 listed sensitive terrestrial species.*

*The Spotted Salamander's range is the eastern United States. The cited study was conducted in Michigan and the report does not include information on ecosystem characteristics at the study site. It appears that the area included a large number of lakes and ponds, which would make it significantly different from the Blacksmith project area. The Blacksmith EIS and specialist reports acknowledge potential negative effects associated with logging upon amphibians and their habitat and includes design criteria to prevent or minimize adverse effects. The one pond present within or near the project area has been considered in the effects analysis and in the Biological Evaluation for Aquatic dependent species.*

*The Roelofs (2003) excerpt, noted above, omits the last sentence of the first paragraph which reads: "Furthermore, I will confine my statement to the geographic region covered by the North Coast Regional Water Quality Control Board, the region of California with which I am most familiar regarding aquatic resources and timber harvest." There are significant differences between the north coastal region of California and the Sierra Nevada. The relevance of the testimony to the Blacksmith Project is not clear. The Blacksmith EIS discloses effects of proposed activities upon aquatic habitat and species, including the impact upon relevant fish species, water quality and soil disturbance.*

*Neither grizzly bear nor wolverine occurs in the project area. Terrestrial wildlife species potentially affected by project activities are analyzed in the Terrestrial Wildlife BA/BE for the project, summarized in Chapter 3 of the EIS. The project would not impact anadromous fish. Affects to aquatic species are disclosed and analyzed in the Aquatic BE/BA for the project and are summarized in Chapter 3 of the EIS.*

**DA-Attachment 1-M** Opinions

Timber Harvest Opposing View #32 - "Fear of wildfire is heavily used to sell these forest "restoration" schemes. Logging has not been proven, in practice, to reduce fire frequency or intensity. Historically, the largest, most destructive blazes, like the Tillamook conflagration, were caused from logging or fueled by slash. Unlogged forests, cool and shaded, are typically more fire resistant than cut over, dried-up stands choked with slash and weeds.

Large-scale logging (by any name) has devalued our forests, degraded our waters, damaged soils, and endangered a wide variety of plants and animals. How will the current round of politically and environmentally propelled 'restorative' logging proposals differ, in practice, from past logging regimes?"

Keene, Roy Restorative Logging? "More rarity than reality" Guest Viewpoint, the Eugene Register Guard March 10, 2011 http://eugeneweekly.com/2011/03/03/views3.html

Timber Harvest Opposing View #73 - "Recently, so called "salvage" logging has increased on national forests in response to a timber industry invented "forest health crisis" which points the finger at normal forest processes of fire, fungi, bacteria, insects and other diseases. In fact the crisis in the national forests is habitat destruction caused by too much clearcutting.

My long-term studies of forest diseases in Idaho show the loss by disease and insect activity in all age classes of forests to be less than or slightly more than 1 percent per year over the past thirty-eight years. These findings are consistent with Forest Service national level data.

Forests are structured systems of many life forms interacting in intricate ways and disturbances are essential to their functioning. It's not fire disease fungi bacteria and insects that are threatening the well being of forests. Disease, fire, windthrow, and other disturbances are a natural part of the forest ecosystem and assist in dynamic processes such as succession that are essential to long term ecosystem maintenance. The real threat facing forests are excessive logging, clearcutting and roadbuilding that homogenize and destroy soil, watersheds and biodiversity of native forests."

Partridge, Arthur Ph.D., Statement at a Press Conference with Senator Robert Torricelli about S. 977 and HR 1376), the Act to Save America's Forests April 28, 1998, U.S. Capitol http://www.saveamericasforests.org/news/ScientistsStatement.htm

***Response:*** *The Keene citation is a published, personal opinion and not a scientific or peer reviewed document. This Blacksmith Project seeks to restore stand-level resilience to wildfire by favoring retention*

*of larger old trees and the thinning of over-dense to reduce the adverse effects of wildfire. Effects from previous fire suppression are described under Purpose and Need .*

*The Partridge opinion was expressed at a news conference largely in response to political discussions related to clearcutting and other harvesting being conducted under policies that were in place nearly two decades ago in efforts to pass additional federal laws to change the policies of the Clinton presidency. The Blacksmith EIS analysis addresses effects of roads upon other resources and is in accord with current federal law and policy.*

**Opposing Views Attachment #4: Roads Damage the Proper Ecological Functioning of the Natural Resources in a Forest**

**DA-Attachment 4-A** Citations regarding road construction effects on habitat fragmentation

Road Construction Opposing View #1 - "Fragmentation has been considered as one of the most major factors that lead to the decline of many wildlife species (Brittingham and Temple 1983, Yahner 1988, Winslow et al. 2000) because fragmentation tends to decrease population productivity (Robinson et al. 1995). Therefore, Meffe states that "fragmentation has become a major subject of research and debate in conservation biology" (Meffe et al. 1997, p. 272). Forest fragmentation usually occurs when large and continuous forests are divided into smaller patches as a result of road establishment, clearing for agriculture, and human development (Robinson et al. 1995, Meffe et al. 1997)." (Pg. 1)

"Generally, habitat fragmentation is an ecological process in which a large patch of habitat is divided into smaller patches of habitats. Usually, this process is caused by human activities (roads, agriculture, and logging). It also reduces the value of the landscape as habitat for many species (plants and animals). Fragmentation alters natural habitat in many ways, including reduction of patches' sizes, increment of distances between similar patches, and increment of edges and predation (Brittingham and Temple 1983, Robinson et al. 1995)." (Pp. 2 and 3)

Al-jabber, Jabber M. 2003 "Habitat Fragmentation: Effects and Implications" http://faculty.ksu.edu.sa/a/Documents/Habitat%20Fragmentation%20Effects%20and%20Implication.pdf

Road Construction Opposing View #11 - "Forest roads apparently can serve as a partial filter to the movements of some amphibian species" deMaynadier, Phillip G. and Malcolm L. Hunter, Jr. "Road Effects on Amphibian Movements in a Forested Landscape" From Natural Areas Journal (2000) Volume: 20, Issue: 1, Pages: 56-65 http://www.mendeley.com/research/road-effects-on-amphibian-movements-in-a-forested-landscape/

Road Construction Opposing View #14 - "Fragmentation caused by roads is of special interest because the effects of roads extend tens to hundreds of yards from the roads themselves, altering habitats and water drainage patterns, disrupting wildlife movement, introducing exotic plant species, and increasing noise levels. The land development that follows roads out into rural areas usually leads to more roads, an expansion process that only ends at natural or legislated barriers."

"Forest Fragmentation and Roads" Eastern Forest Environmental Threat Assessment Center U.S. Forest Service - Southern Research Station http://www.forestthreats.org/publications/su-srs-018/fragmentation

Road Construction Opposing View #42 - "Increasingly, previously extensive, continuous tracts of forest are being reduced to widely dispersed patches of remnant forest vegetation by logging and road-building, but few measures of the effects of roads on forest fragmentation are available. Fragmentation affects animal populations in a variety of ways, including decreased species diversity and lower densities of some animal species in the resulting smaller patches. This study seeks to quantify the effects of roads and logging activities on forest habitat."

"Roads precipitate fragmentation by dissecting previously large patches into smaller ones, and in so doing they create edge habitat in patches along both sides of the road, potentially at the expense of interior habitat. As the density of roads in landscapes increases, these effects increase as well. McGurk and Fong (1995) considered the additive effects of clearcuts and roads, but did not measure the amount of associated edge habitat. Thus a more direct measurement of the impacts of roads on landscapes is needed."

Reed, R.A., Johnson-Barnard, J., and Baker, W.A. 1996. "Contribution of Roads to Forest Fragmentation in the Rocky Mountains." Conservation Biology 10: 1098-1106. http://cpluhna.nau.edu/Research/contribution_of_roads_to_forest_.htm

Road Construction Opposing View #53 - "Roads are a major contributor to habitat fragmentation because they divide large landscapes into smaller patches and convert interior habitat into edge habitat. As additional road construction and timber harvest activities increase habitat fragmentation across large areas, the populations of some species may become isolated, increasing the risk of local extirpations or extinctions (Noss and Cooperrider 1994)."

"Habitat fragmentation creates landscapes made of altered habitats or developed areas fundamentally different from those shaped by natural disturbances that species have adapted to over evolutionary time (Noss and Cooperrider 1994 in Meffe et al. 1997). Adverse effects of habitat fragmentation to both wildlife populations and species include:

"Increased isolation of populations or species, which leads to:

- Adverse genetic effects; i.e. inbreeding depression (depressed fertility and fecundity, increased natal mortality) and decreased genetic diversity from genetic drift and bottlenecks,
- Increased potential for extirpation of localized populations or extinction of narrowly distributed species from catastrophic events such as hurricanes, wildfires or disease outbreaks,
- Changes in habitat vegetative composition, often to weedy and invasive species,
- Changes in the type and quality of the food base,
- Changes in microclimates by altering temperature and moisture regimes,
- Changes in flows of energy and nutrients,

- Changes in the availability of cover and increases edge effect, bringing together species that might otherwise not interact, potentially increasing rates of predation, competition and nest parasitism, and
- Increased opportunities for exploitation by humans, such as poaching or illegal collection for the pet trade."

Watson, Mark L. "Habitat Fragmentation and the Effects of Roads on Wildlife and Habitats." Background and Literature Review 2005.
http://www.wildlife.state.nm.us/conservation/habitat_handbook/documents/2004EffectsofRoadsonWil dlifeandHabitats.pdf

Road Construction Opposing View #57 - "Forest fragmentation occurs when large, contiguous blocks of forest are broken up into isolated islands by development, roads, or clearing for agriculture. Just as inbreeding among the royal families of Europe spread hemophilia, forest fragmentation negatively impacts the long term sustainability of both plant and animal communities. Geographic isolation results in inbreeding and diminishes biodiversity."

Zimmerman, E.A. and P.F. Wilbur "A Forest Divided"
New Roxbury Land Trust newsletter, 2004
http://www.ourbetternature.org/forestfrag.htm

***Response:*** *Forest Service policy is for that for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative (FSH 1909.15).*

*Forest Service Manual (FSM) 2672.42 directs that a biological assessment (BA) be prepared for all proposed projects that may have effects upon federally proposed, threatened, and endangered species to ensure that project decisions do not adversely affect federally listed species. In addition, FSM 2670.32 directs that a biological evaluation (BE) be prepared to evaluate the effects of proposed projects on Forest Service Region 5 designated sensitive species to ensure that project decisions do not result in the loss of species viability or create significant trends towards federal listing.*

*The terrestrial and aquatic wildlife reports for the project examine and analyze the potential effects on Threatened, Endangered and Sensitive wildlife species and the botany report for the project analyzes the potential effects on Threatened, Endangered and Sensitive plants from increased fragmentation that could result based on project activities. These reports are summarized in Chapter 3 of the EIS. Additionally, Alternative 3 has been modified to exclude new road construction.*

**DA-Attachment 4-B** Citations showing damage to forest resources from roads including general effects to soil, slope stability, hydrologic function, native plants and wildlife.

Road Construction Opposing View #2 - "Debris slides over a 20-year period were inventoried on 137,500 acres of forested land in the Klamath Mountains of southwest Oregon. Frequency during the study period was about one slide every 4.3 years on each 1,000 acres-an erosion rate of about 1/2 yd3 per acre per year. Erosion rates on roads and landings were 100 times those on undisturbed areas,

while erosion on harvested areas was seven times that of undisturbed areas. Three-quarters of the slides were found on slopes steeper than 70 percent and half were on the lower third of slopes."

"Soil erosion rates due to debris slides were many times higher on forests with roads, landings, and logging activity than on undisturbed forests."

Amaranthus, Mike P. Ph.D., Raymond M. Rice Ph.D., N. R. Barr
and R. R. Ziemer Ph.D. "Logging and forest roads related to
increased debris slides in southwestern Oregon." Journal of Forestry Vol. 83, No. 4. 1985.
http://www.humboldt.edu/~rrz7001/pubs/Ziemer85.PDF

Road Construction Opposing View #3 - " 'Roads may have unavoidable effects on streams, no matter how well they are located, designed or maintained. The sediment contribution to streams from roads is often much greater than that from all other land management activities combined, including log skidding and yarding.' (Gibbons and Salo 1973). Research by Megahan and Kidd in 1972 found that roads built in areas with highly erosive soils can contribute up to 220 times as much sediment to streams as intact forests."

"Applying Ecological Principles to Management of the U.S. National Forests" Issues in Ecology Number 6 Spring 2000 http://www.watertalk.org/wawa/ecosci.html

Road Construction Opposing View #4 - "Plot-level studies have demonstrated the ability of forest roads to intercept and route both subsurface and surface overland flow more efficiently to the stream network. Significant amount of subsurface throughflow can be intercepted by the road, as a function of the road cut depth and the current saturation deficit, and then redirected, concentrating the flow in particular areas below the road. Road drainage concentration increases the effective length of the channel network and strongly influences the distribution of erosional processes. The concept of wetness index has been used in the study as a surrogate for subsurface throughflow, and the effect of forest roads on subsurface throghflow rerouting has been assessed by evaluating the changes in terms of draining upslope areas. A threshold model for shallow slope instability has been used to analyse erosional impacts of drainage modifications. In the model, the occurrence of shallow landsliding is evaluated in terms of drainage areas, ground slope and soil properties (i.e., hydraulic conductivity, bulk density, and friction angle). The model has been used to generate hypotheses about the broader geomorphic effect of roads. Modelling results have been compared with available field data collected in north-eastern Italy."

Borga, M., F. Tonelli, G. Dalla Fontana and F. Cazorzi "Evaluating the Effects of Forest Roads on Shallow Landsliding" Geophysical Research Abstracts, Vol. 5, 13312, 2003
http://www.cosis.net/abstracts/EAE03/13312/EAE03-J-13312.pdf

Road Construction Opposing View #5 - "A large scale land use experiment has taken place over the last 40 years in the mountainous areas of the northwestern U.S. through timber harvesting. This land use change effects the hydrology of an area through two mechanisms:

Clear-cut logging which causes changes in the dynamics of Rain-On-Snow (ROS) events due to changes in the accumulation and ablation of snow caused by vegetation effects on snow interception and melt; and

Construction and maintenance of forest roads which channel intercepted subsurface flow and infiltration excess runoff to the stream network more quickly."

Bowling, L.C., D. P. Lettenmaier, M. S. Wigmosta and W. A. Perkins
"Predicting the Effects of Forest Roads on Streamflow using a
Distributed Hydrological Model" from a poster presented at the fall meeting of the American Geophysica Union, San Francisco, CA, December 1996.
http://www.ce.washington.edu/~lxb/poster.html

Road Construction Opposing View #8 - "Sediment input to freshwater is due to either the slower, large-scale process of soil erosion, or to rapid, localized "mass movements," such as landslides. Forest practices can increase the rate at which both processes occur. Most sediment from forestry arises from landslides from roads and clearcuts on steep slopes, stream bank collapse after riparian harvesting, and soil erosion from logging roads and harvested areas. Roads, particularly those that are active for long periods of time, are likely the largest contributor of forestry-induced sediment (Furniss et al. 1991)."

"Sediment can increase even when roads comprise just 3% of a basin (Cederholm et al. 1981)."

"More than half the species present in the study area will likely be negatively impacted by sedimentation from logging roads."

"In areas made highly turbid (cloudy) from sedimentation, the foraging ability of adults and juveniles may be inhibited through decreased algal production and subsequent declines in insect abundance, or, for visual-feeding taxa dependent on good light, through their inability to find and capture food. Highly silted water may damage gill tissue and cause mortality or physiological stress of adults and juveniles."

Bunnell, Fred L. Ph.D., Kelly A. Squires and Isabelle Houde. 2004
"Evaluating effects of large-scale salvage logging for mountain
pine beetle on terrestrial and aquatic vertebrates."
Mountain Pine Beetle Initiative Working Paper 1. Canadian Forest Service.
http://warehouse.pfc.forestry.ca/pfc/25154.pdf

Road Construction Opposing View #9 - "The road construction and right-of-way logging were immediately detrimental to most aquatic invertebrates in South Fork Caspar Creek"

"Salmonid populations decreased immediately after the road construction."

"Sustained logging and associated road construction over a period of many years do not afford either the stream or the 'fish population a chance to recover."

Burns, James W., "Some Effects of Logging and Associated Road Construction on Northern California Streams." Transactions of the American Fisheries Society, Volume 1, Number 1, January 1972. http://www.fs.fed.us/psw/publications/4351/Burns72.pdf

Road Construction Opposing View #13 - "Few marks on the land are more lasting than roads."

"The negative effects on the landscape of constructing new roads, deferring maintenance, and decommissioning old roads are well documented. Unwanted or non-native plant species can be transported on vehicles and clothing by users of roads, ultimately displacing native species. Roads may fragment and degrade habitat for wildlife species and eliminate travel corridors of other species. Poorly designed or maintained roads promote erosion and landslides, degrading riparian and wetland habitat through sedimentation and changes in streamflow and water temperature, with associated reductions in fish habitat and productivity. Also, roads allow people to travel into previously difficult or impossible to access areas, resulting in indirect impacts such as ground and habitat disturbance, increased pressure on wildlife species, increased litter, sanitation needs and vandalism, and increased frequency of human-caused fires."

EPA entry into the Federal Register: March 3, 2000 (Volume 65,
Number 43) Page 11675, "National Forest System Road Management."
http://www.epa.gov/fedrgstr/EPA-GENERAL/2000/March/Day-03/g5002.htm

Road Construction Opposing View #15 - "A huge road network with vehicles ramifies across the land, representing a surprising frontier of ecology. Species-rich roadsides are conduits for few species. Roadkills are a premier mortality source, yet except for local spots, rates rarely limit population size. Road avoidance, especially due to traffic noise, has a greater ecological impact. The still-more-important barrier effect subdivides populations, with demographic and probably genetic consequences. Road networks crossing landscapes cause local hydrologic and erosion effects, whereas stream networks and distant valleys receive major peak-flow and sediment impacts. Chemical effects mainly occur near roads. Road networks interrupt horizontal ecological flows, alter landscape spatial pattern, and therefore inhibit important interior species. Thus, road density and network structure are informative landscape ecology assays. Australia has huge road-reserve networks of native vegetation, whereas the Dutch have tunnels and overpasses perforating road barriers to enhance ecological flows. Based on road-effect zones, an estimated 15–20% of the United States is ecologically impacted by roads."

Forman, Richard T. and Lauren E. Alexander "Roads and their Major Ecological Effects" Annual Review of Ecology and Systematics, Vol. 29: 207-231, November 1998
http://arjournals.annualreviews.org/doi/abs/10.1146/annurev.ecolsys.29.1.207?cookieSet=1&journalCode=ecolsys.1

Road Construction Opposing View #16 - “Questions to consider: Roads dramatically alter forest ecosystems

Franklin, Jerry Ph.D., David Perry Ph.D., Reed Noss Ph.D., David Montgomery Ph.D. and Christopher Frissell Ph.D. 2000. "Simplified Forest Management to Achieve Watershed and Forest Health: A Critique." A National Wildlife Federation publication sponsored by the Bullitt Foundation http://www.coastrange.org/documents/forestreport.pdf

Road Construction Opposing View #18 - "Rarely can roads be designed and built that have no negative impacts on streams. Roads modify natural drainage patterns and can increase hillslope erosion and downstream sedimentation. Sediments from road failures at stream crossings are deposited directly into stream habitats and can have both on-site and off-site effects. These include alterations of the channel pattern or morphology, increased bank erosion and changes in channel width, substrate composition, and stability of slopes adjacent to the channels."

"All of these changes result in important biological consequences that can affect the entire stream ecosystem. One specific example involves anadromous salmonids, such as salmon and steelhead, that have complex life histories and require suitable stream habitat to support both juvenile and adult life stages."

"A healthy fishery requires access to suitable habitat that provides food, shelter, spawning gravel, suitable water quality, and access for upstream and downstream migration. Road-stream crossing failures have direct impacts on all of these components."

Furniss, Michael J., Michael Love Ph.D. and Sam A. Flanagan "Diversion Potential at Road-Stream Crossings." USDA Forest Service. 9777 1814—SDTDC. December 1997. http://www.stream.fs.fed.us/water-road/w-r-pdf/diversionpntl.pdf

Road Construction Opposing View #19 - “Barry Noon, a professor of wildlife ecology at Colorado State University, noted that scientific research has consistently shown the adverse effects of roads on hydrologic processes and fish and wildlife populations.

“ “One of the key things to recognize is the effects of the roads extend far beyond their immediate footprint,” Noon said. For example, “in terms of hydrology, the roads are leading to faster runoff of water, often with great increases in sedimentation, particularly following storm events, and roads in watersheds often lead to increases in the intensity of floods.” “

These changes degrade fish habitat because of the increased sedimentation that leads to decreases in water quality, Noon said. And roads fragment wildlife habitat and create areas that animals avoid, often as result of increased hunting, he said.”

Gable, Eryn “Battling beetles may not reduce fore risks – report”
Land Letter, March 4, 2010
http://www.xerces.org/2010/03/04/battling-beetles-may-not-reduce-fire-risks-report/

Road Construction Opposing View #20 - "Roads and skid trails have been identified as a major contributor to increased turbidity of water draining logging areas resulting in increases from 4 to 93 parts per million (Hoover, 1952). Forest roads have been found to have erosion rates from one to three orders of magnitude greater than similar undisturbed areas (Megahan, 1974) and perhaps account for as much as 90 percent of all forest erosion (Megahan, 1972). Forest roads can also cause soil erosion and stream sedimentation, which adversely impact on the nation's water quality (Authur et al., 1998).

Grace, Johnny M. III Ph.D. 2003. "Minimizing the impacts of the forest road system." In: Proceedings of the conference 34 international erosion control association; ISSN 1092-2806. [Place of publication unknown]: International Erosion Control Association: 301-310. http://www.srs.fs.usda.gov/pubs/ja/ja_grace011.pdf

Road Construction Opposing View #21 - "Roads have well-documented, short- and long-term effects on the environment that have become highly controversial, because of the value society now places on unroaded wildlands and because of wilderness conflicts with resource extraction."

"(Road) consequences include adverse effects on hydrology and geomorphic features (such as debris slides and sedimentation), habitat fragmentation, predation, road kill, invasion by exotic species, dispersal of pathogens, degraded water quality and chemical contamination, degraded aquatic habitat, use conflicts, destructive human actions (for example, trash dumping, illegal hunting, fires), lost solitude, depressed local economies, loss of soil productivity, and decline in biodiversity."

Gucinski, Hermann Ph.D., Michael J. Furniss, Robert R. Ziemer Ph.D. and Martha H. Brookes, Editors. 2001. "Forest Roads: A Synthesis of Scientific Information." USDA Forest Service, General Technical Report PNW-GTR-509. http://www.fs.fed.us/pnw/pubs/gtr509.pdf

Road Construction Opposing View #23 - "Many forested landscapes are fragmented by roads, but our understanding of the effects of these roads on the function and diversity of the surrounding forest is in its infancy. I investigated the effect of roads in otherwise continuous forests on the macroinvertebrate fauna of the soil. I took soil samples along transects leading away from the edges of unpaved roads in the Cherokee National Forest in the Southern Appalachian mountains of the United States. Roads significantly depressed both the abundance and the richness of the macroinvertebrate soil fauna. Roads also significantly reduced the depth of the leaf-litter layer. These effects persisted up to 100 m into the forest. Wider roads and roads with more open canopies tended to produce steeper declines in abundance, richness, and leaf-litter depth, but these effects were significant only for canopy cover and litter depth. The macroinvertebrate fauna of the leaf litter plays a pivotal role in the ability of the soil to process energy and nutrients. These macroinvertebrates also provide prey for vertebrate species such as salamanders and ground-foraging birds. The effect of roads on the surrounding forest is compounded by the sprawling nature of the road system in this and many other forests. My data suggest that even relatively narrow roads through forests can produce marked edge effects that may have negative consequences for the function and diversity of the forest ecosystem."

Haskell, David G. Ph.D. 1999 “Effects of Forest Roads on Macroinvertebrate Soil Fauna of the Southern Appalachian Mountains” http://www.jstor.org/stable/2641904

Road Construction Opposing View #24 - “Roads remove habitat, alter adjacent areas, and interrupt and redirect ecological flows. They subdivide wildlife populations, foster invasive species spread, change the hydrologic network, and increase human use of adjacent areas. At broad scales, these impacts cumulate and define landscape patterns.”

Hawbaker, Todd J. Ph.D., Volker C. Radeloff Ph.D., Murray K. Clayton Ph.D., Roger B. Hammer Ph.D., and Charlotte E. Gonzalez-Abraham Ph.D. “Road Development, Housing Growth, and Landscape Fragmentation In Northern Wisconsin: 1937–1999” Ecological Applications: Vol. 16, No. 3, pp. 1222-1237.
http://www.esajournals.org/doi/abs/10.1890/1051-0761%282006%29016%5B1222%3ARDHGAL%5D2.0.CO%3B2?journalCode=ecap

Road Construction Opposing View #26 - "Although disturbance patches are created by peak flow and debris flow disturbances in mountain landscapes without roads, roads can alter the landscape distributions of the starting and stopping points of debris flows, and they can alter the balance between the intensity of flood peaks and the stream network's resistance to change."

Jones, Julia A. Ph.D., Frederick J. Swanson Ph.D. Beverley C. Wemple Ph.D., and Kai U. Snyder. "Effects of roads on hydrology, geomorphology, and disturbance patches in stream networks." Conservation Biology 14, No. 1. 2000. http://www.jstor.org/stable/2641906

Road Construction Opposing View #27 - "In the Pacific Northwest, the two main processes that contribute to sediment production are mass failure and surface erosion from forest roads (Fredriksen 1970, Reid and Dunne 1984). In the Clearwater River basin in the State of Washington, as much as 40 percent of the sediment produced in the watershed was attributed to logging roads (Reid 1980)."

Kahklen, Keith. "A Method for Measuring Sediment Production from Forest Roads." Pacific Northwest Research Station, USDA Forest Service. Research note PNW-RN-529, April 2001. http://www.fs.fed.us/pnw/pubs/rn529.pdf

Road Construction Opposing View #29 - “Forest fragmentation, as scientists call the intentional felling of woodland, is actually two processes. In populated areas such as the Atlantic seaboard, it means reduction in the size of forest tracts, usually due to suburbanization and development. In less inhabited areas--northern New England, for example--forest fragmentation refers to isolation of one patch of forest from another by logging, or by the building of roads or power lines.”

Lawren, Bill 1992 “Singing the Blues for Songbirds: Bird lovers lament as experts ponder the decline of dozens of forest species” National Wildlife http://www.nwf.org/News-and-Magazines/National-Wildlife/Birds/Archives/1992/Singing-the-Blues-for-Songbirds.aspx

Road Construction Opposing View #30 - "The compaction of forest road soils is known to reduce aeration, porosity, infiltration rates, water movement, and biological activity in soils. Research indicates that soil bulk density, organic matter, moisture, and litter depths are much lower on roads than on nearby forest lands. Macropores, which provide soil drainage and infiltration, have been shown to significantly decrease in size as a result of road construction and use. Reduced infiltration and increased compaction promote soil erosion, especially during the seasonal southwestern monsoon rains (Elseroad 2001)."

"Physical disturbances caused by road construction and vehicle use create ideal conditions for colonization by invasive exotic plant species. The use of roads by vehicles, machinery, or humans often aids the spread of exotic plant seeds. Once established, they can have long-term impacts on surrounding ecosystems and can be difficult to remove."

"Roads are known to cause habitat fragmentation. Many create ecological 'edges' with different plant species, light levels, and hiding cover, all of which may alter animal survival, reproductive success, and movement patterns. The introduction of exotic plants can disrupt the availability of native vegetation used by wildlife for food and shelter (Trombulak and Frissell 1999)."

"Forest roads often develop a water-repellent soil layer caused by lack of vegetative cover and changes in soil composition. This can substantially influence how runoff is processed. Erosion, the formation of water channels beside the road, and increased sediment loads in nearby streams are common results of this process (Baker 2003)."

"Because they provide easier access to many forest tracts, forest roads often allow more human-caused fires to be ignited."

Lowe, Kimberly Ph.D.,"Restoring Forest Roads." A Northern Arizona University Ecological Restoration Institute publication **Working Paper 12. June, 2005.**
http://www.eri.nau.edu/en/information-for-practitioners/restoring-forest-roads

Road Construction Opposing View #31 - "Almost everywhere people live and work they build and use unimproved roads, and wherever the roads go, a range of environmental issues follows."

"Among the environmental effects of unimproved roads, those on water quality and aquatic ecology are some of the most critical. Increased chronic sedimentation, in particular, can dramatically change the food web in affected streams and lakes."

"The nearly impervious nature of road surfaces (or treads) makes them unique within forested environments and causes runoff generation even in mild rainfall events, leading to chronic fine sediment contributions."

"If we look at the issue of what we need to learn or the research priorities for forest road hydrology, I would argue that the areas of cutslope hydrology and effectiveness of restoration efforts are perhaps most critical."

"At a few sites in the mountains of Idaho and Oregon a substantial portion of the road runoff (80–95%) came from subsurface flow intercepted by the cutslope (Burroughs et al., 1972; Megahan, 1972; Wemple, 1998)."

Luce, Charles H. Ph.D., 2002. "Hydrological processes and pathways affected by forest roads: what do we still need to learn?" Hydrologic Processes: 16, 2901–2904.
http://www.fs.fed.us/rm/boise/teams/soils/Publications/Luce%202002%20HP.pdf

Road Construction Opposing View #32 - "Roads in the watershed contribute to sediment production by concentrating runoff, thereby increasing sediment load to the stream network. Most unimproved (dirt) roads connect either directly or indirectly with streams and, therefore, act as extensions of stream networks by effectively increasing watershed drainage density and subsequently sediment loads to streams. In the South Fork subwatershed of Squaw Creek, road connectivity has resulted in an increase in effective drainage density of approximately 250%. Throughout the Squaw Creek watershed, it is estimated that dirt roads potentially contribute as much as 7,793 metric tons/year to the watershed sediment budget."

Maholland, Becky and Thomas F. Bullard Ph.D., "Sediment-Related Road Effects on Stream Channel Networks in an Eastern Sierra Nevada Watershed." Journal of the Nevada Water Resources Association, Volume 2, Number 2, Fall 2005.
http://www.nvwra.org/docs/journal/vol_2_no_2/NWRAjournal_fall2005_article4.pdf

Road Construction Opposing View #33 - "One of the greatest impacts of roads and (especially motorized) trails is their effect on the hydrology of natural landscapes, including the flow of surface and ground water and nutrients. These hydrologic effects are responsible for changes to geomorphic processes and sediment loads in roaded areas (Luce and Wemple 2001)." (pg. 12)

Malecki, Ron W. "A New Way to Look at Forest Roads: the Road Hydrologic Impact Rating System (RHIR)" The Road-RIPorter, Autumn Equinox, 2006
http://www.wildlandscpr.org/files/uploads/RIPorter/rr_v11-3.pdf

Road Construction Opposing View #34 - "A study was made on 344 miles of logging roads in northwestern California to assess sources of erosion and the extent to which road-related erosion is avoidable. At most, about 24 percent of the erosion measured on the logging roads could have been prevented by conventional engineering methods. The remaining 76 percent was caused by site conditions and choice of alignment. On 30,300 acres of commercial timberland, an estimated 40 percent of the total erosion associated with management of the area was found to have been derived from the road system."

McCashion, J. D. and R. M. Rice Ph.D. 1983. "Erosion on logging roads in northwestern California: How much is avoidable?"
Journal of Forestry 8(1): 23-26.
http://www.fs.fed.us/psw/rsl/projects/water/McCashion.pdf

Road Construction Opposing View #35 - "Research has shown that roads can have adverse impacts on the water quality on the forest landscape (Authur et al. 1998; Binkley and Brown 1993; Megahan et al. 1991). The forest road system has been identified by previous research as the major source of soil erosion on forestlands (Anderson et. al 1976; Patric 1976; Swift 1984; Van Lear et al. 1997). Furthermore, roads are cited as the dominant source of sediment that reaches stream channels (Packer 1967; Trimble and Sartz 1957; Haupt 1959)."

McFero III, Grace, J. "Sediment Plume Development from
Forest Roads: How are they related to Filter Strip Recommendations?"
An ASAE/CSAE Meeting Presentation, Paper Number: 045015, August 1-4, 2004.
http://www.srs.fs.usda.gov/pubs/ja/ja_grace017.pdf

Road Construction Opposing View #36 - "Overall, roads had a greater impact on landscape structure than logging in our study area. Indeed, the 3-fold increase in road density between 1950–1993 accounted for most of the changes in landscape configuration associated with mean patch size, edge density, and core area."

McGarigal, Kevin Ph.D., William H. Romme Ph.D. Michele Crist Ph.D.and Ed Roworth Ph.D. "Cumulative effects of roads and logging on landscape structure in the San Juan Mountains, Colorado (USA)" Landscape Ecology, Volume 16, Number 4 / May, 2001
http://www.springerlink.com/content/w12557624742tv77/

Road Construction Opposing View #38 - "Erosion from forest roads can be a large source of sediment in watersheds managed for timber production."

Megahan, Walter F. Ph.D. "Predicting Road Surface Erosion from Forest Roads in Washington State" from a presentation presented at the 2003 Geological Society of America meeting.
http://gsa.confex.com/gsa/2003AM/finalprogram/abstract_67686.htm

Road Construction Opposing View #40 - "Nothing is worse for sensitive wildlife than a road. Over the last few decades, studies in a variety of terrestrial and aquatic ecosystems have demonstrated that many of the most pervasive threats to biological diversity - habitat destruction and fragmentation, edge effects, exotic species invasions, pollution, and overhunting - are aggravated by roads. Roads have been implicated as mortality sinks for animals ranging from snakes to wolves; as displacement factors affecting animal distribution and movement patterns; as population fragmenting factors; as sources of sediments that clog streams and destroy fisheries; as sources of deleterious edge effects; and as access corridors that encourage development, logging and poaching of rare plants and animals."

"Most public agencies disregard the ecological impacts of roads, and attempt to justify timber roads as benefiting recreation and wildlife management. Even when a land manager recognizes the desirability of closing roads, he or she usually contends that such closures would be unacceptable to the public."

"The Forest Service and other public agencies will claim that road closures, revegetation, and other restorative measures are too expensive to be implemented on a broad scale. But much of the approximately $400 million of taxpayers' money squandered annually by the Forest Service on below-cost timber sales goes to road-building. Road maintenance is also expensive. Virtually all of this money could be channeled into road closures and associated habitat restoration. This work would be labor-intensive, and providing income to the many laid off loggers, timber sale planners, and road engineers -- for noble jobs, rather than jobs of destruction!"

Noss, Reed F., Ph.D. 1995. "The Ecological Effects of Roads or the Road to Destruction" Wildlands CPR http://www.wildlandscpr.org/ecological-effects-roads

Road Construction Opposing View #43 - "Erosion on roads is an important source of fine-grained sediment in streams draining logged basins of the Pacific Northwest. Runoff rates and sediment concentrations from 10 road segments subject to a variety of traffic levels were monitored to produce sediment rating curves and unit hydrographs for different use levels and types of surfaces. These relationships are combined with a continuous rainfall record to calculate mean annual sediment yields from road segments of each use level. A heavily used road segment in the field area contributes 130 times as much sediment as an abandoned road. A paved road segment, along which cut slopes and ditches are the only sources of sediment, yields less than 1% as much sediment as a heavily used road with a gravel surface."

Reid, L. M. Ph.D. and T. Dunne (1984), "Sediment Production from Forest Road Surfaces," Water Resour. Res., 20(11), 1753–1761.
http://www.agu.org/pubs/crossref/1984/WR020i011p01753.shtml

Road Construction Opposing View #44 - "Roads are associated with high sediment inputs and altered hydrology, both of which can strongly influence downstream channel habitats. Roads are also important as a source of indirect human impacts and as an agent of vegetation change and wildlife disturbance."

"Any ground disturbance increases the potential for erosion and hydrologic change, and roads are a major source of ground disturbance in wildlands. Compacted road surfaces generate overland flow, and much of this flow often enters the channel system, locally increasing peak flows. Localized peak flows are also increased where roads divert flow from one swale into another, and where roadcuts intercept subsurface flows."

"Overland flow from the road surface is a very effective transport medium for the abundant fine sediments that usually are generated on road surfaces. Road drainage also can excavate gullies and cause landslides downslope in swales. Cut and fill slopes are often susceptible to landsliding, and road-related landsliding is the most visible forestry-related erosional impact in many areas."

Reid, Leslie M. Ph.D., Robert R. Ziemer Ph.D., and Michael J. Furniss 1994. "What do we know about Roads?" USDA Forest Service. http://www.fs.fed.us/psw/publications/reid/4Roads.htm

Road Construction Opposing View #45 - "Disturbances from roadbuilding and logging changed the sediment/discharge relationship of the South Fork from one which was supply dependent to one which was stream power dependent, resulting in substantial increases in suspended sediment discharges."

"Road construction and logging appear to have resulted in increases in average turbidity levels (as inferred from suspended sediment increases) above those permitted by Regional Water Quality Regulations."

Rice, Raymond M. Ph.D., Forest B. Tilley and Patricia A. Datzman. 1979. "Watershed's Response to Logging and Roads: South Fork of Caspar Creek, California, 1967-1976." USDA Forest Service, Research Paper PSW-146.
http://www.fs.fed.us/psw/publications/rice/Rice79.pdf

Road Construction Opposing View #46 - "Sediment eroded from gravel roads can be a major component of the sediment budget in streams in this region (Van Lear, et al, 1995)."

Riedel, Mark S. Ph.D. and James M. Vose Ph.D., "Forest Road Erosion, Sediment Transport and Model Validation in the Southern Appalachians." Presented at the Second Federal Interagency Hydrologic Modeling Conference, July 28 – August 1, 2002.
http://www.srs.fs.usda.gov/pubs/ja/ja_riedel002.pdf

Road Construction Opposing View #47 - "Early studies of elk were among the first to address effects of roads on wildlife, establishing a precedent for subsequent research on a wide range of terrestrial and aquatic species. These early elk-roads studies included those reported in a symposium on the topic in 1975 (Hieb 1976), the seminal studies of Jack Lyon in Montana and northern Idaho (Lyon 1979, 1983, 1984), the Montana Cooperative Elk-Logging Study (Lyon et al. 1985), and work by Perry and Overly (1977) in Washington and Rost and Bailey (1979) in Colorado.

As research and analysis techniques have become more sophisticated, particularly with the advent of geographic information systems (GIS) and high-resolution remote imagery, the study of effects of roads on terrestrial and aquatic communities has evolved into a unique discipline of "road ecology" (Forman et al. 2003). Road effects are far more pervasive than originally believed and include such disparate consequences as population and habitat fragmentation, accelerated rates of soil erosion, and invasion of exotic plants along roadways. Indeed, "in public wildlands management, road systems are the largest human investment and the feature most damaging to the environment" (Gucinski et al. 2001:7). Summaries of the effects of roads on wildlife habitats and biological systems in general have been compiled by Forman and Alexander (1998), Trombulak and Frissell (2000), Gucinski et al. (2001), Forman et al. (2003) and Gaines et al. (2003)."

Rowland, M. M., M. J. Wisdom, B. K. Johnson, and M. A. Penninger 2005. "Effects of Roads on Elk: Implications for Management in Forested Ecosystems." Pages 42-52 in Wisdom, M. J., technical editor, The Starkey Project: a synthesis of long-term studies of elk and mule deer Reprinted from the

2004 Transactions of the North American Wildlife and Natural Resources Conference, Alliance Communications Group.
http://www.fs.fed.us/pnw/pubs/journals/pnw_2004_rowland001.pdf

Road Construction Opposing View #48 - "The consequences of road construction to wildlife are generally negative. Roads result in increased human access, habitat fragmentation, disturbance, and in some cases direct mortality due to vehicle collisions."

"Research has documented an 80% decline in grizzly bear habitat use within 1 km of open roads used by motorized vehicles in Montana9. This has been ascribed either to bears avoiding humans or to the selective over-harvest of bears habituated to humans that would otherwise more fully use areas heavily influenced by people."

Schwartz, Chuck Ph.D. - March 1998 "Wildlife and Roads" The Interagency Forest Ecology Study Team (INFEST) newsletter http://www.sf.adfg.state.ak.us/sarr/forestecology/fsroads.cfm

Road Construction Opposing View #49 - "The effects of forest roads on hydrology are related to the effects of forest clearing. Most logging requires road access, and the roads often remain after the logging, so there are both short and long-term effects.94 Forest road surfaces are relatively impermeable. Water readily runs over the road surface and associated roadside ditches, often directly to a stream channel, with the net effect of extending channel networks and increasing drainage density.95 In addition to providing conduits for overland flow, forest roads involve slope-cuts and ditching that may intersect the water table and interrupt natural subsurface water movement.96 This diversion of subsurface water may be quantitatively more important than the overland flow of storm water in some watersheds.97 The importance of roads in altering basin hydrology has been underscored in paired-watershed studies and recent modeling studies.98 " (Pgs. 730 and 731)

Shanley, James B. and BeverleyWemple Ph.D. "Water Quantity and Quality in the Mountain Environment" Vermont Law Review, Vol. 26:717, 2002
http://www.uvm.edu/~bwemple/pubs/shanley_wemple_law.pdf

Road Construction Opposing View #50 - "Roads are often the major source of soil erosion from forested lands (Patric 1976)."

"Generally, soil loss is greatest during and immediately after construction."

Swift Jr., L. W. "Soil losses from roadbeds and cut and fill slopes in the Southern Appalachian Mountains." Southern Journal of Applied Forestry 8: 209-216. 1984.
http://cwt33.ecology.uga.edu/publications/403.pdf

Road Construction Opposing View #51 - "More subtle causes of habitat loss include the construction of roads and power lines. These linear barriers also have been correlated with a decline in neotropical migrant songbirds (Berkey 1993; Boren et al. 1999; Ortega and Capen 2002). Whether by forest conversion or the construction of roads and power lines, fragmentation subdivides habitat into smaller

and smaller parcels. The result is an increase of edge habitat, or the boundary between intact forest and surrounding impacted areas. Small forests with large amounts of edge habitat are a hostile landscape for nesting neotropical migratory songbirds. In these areas, songbirds face two great threats: 1) the loss of eggs and nestlings to predators and, 2) parasitism by cowbirds."

Switalski, Adam "Where Have All the Songbirds Gone? Roads, Fragmentation, and the Decline of Neotropical Migratory Songbirds" Wildlands CPR, September 8, 2003 http://www.wildlandscpr.org/node/213

Road Construction Opposing View #52 - "Roads are a widespread and increasing feature of most landscapes. We reviewed the scientific literature on the ecological effects of roads and found support for the general conclusion that they are associated with negative effects on biotic integrity in both terrestrial and aquatic ecosystems. Roads of all kinds have seven general effects: mortality from road construction, mortality from collision with vehicles, modification of animal behavior, alteration of the physical environment, alteration of the chemical environment, spread of exotics, and increased use of areas by humans. Road construction kills sessile and slow-moving organisms, injures organisms adjacent to a road, and alters physical conditions beneath a road. Vehicle collisions affect the demography of many species, both vertebrates and invertebrates; mitigation measures to reduce roadkill have been only partly successful. Roads alter animal behavior by causing changes in home ranges, movement, reproductive success, escape response, and physiological state. Roads change soil density, temperature, soil water content, light levels, dust, surface waters, patterns of runoff, and sedimentation, as well as adding heavy metals (especially lead), salts, organic molecules, ozone, and nutrients to roadside environments. Roads promote the dispersal of exotic species by altering habitats, stressing native species, and providing movement corridors. Roads also promote increased hunting, fishing, passive harassment of animals, and landscape modifications. Not all species and ecosystems are equally affected by roads, but overall the presence of roads is highly correlated with changes in species composition, population sizes, and hydrologic and geomorphic processes that shape aquatic and riparian systems. More experimental research is needed to complement post-hoc correlative studies. Our review underscores the importance to conservation of avoiding construction of new roads in roadless or sparsely roaded areas and of removal or restoration of existing roads to benefit both terrestrial and aquatic biota."

Trombulak, Stephen C. Ph.D. and Christopher A. Frissell Ph.D. "Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities" Conservation Biology, Volume 14, No. 1, Pages 18–30, February 2000 http://www.transwildalliance.org/resources/200922144524.pdf

Road Construction Opposing View #54 - "Our analysis also indicated that >70 percent of the 91 species are affected negatively by one or more factors associated with roads."

"Roads in forested areas increase trapping pressures for martens and fishers, resulting in significantly higher captures in roaded versus unroaded areas (Hodgman and others 1994) and in logged versus unlogged areas, in which the difference was again attributed to higher road densities in logged stands (Thompson 1994). Secondary roads also might increase the likelihood that snags and logs will be

removed for fuel wood. This could impact fishers, martens and flammulated owls, and also could have a negative effect on the prey base for goshawks (Reynolds and others 1992)."

"An additional, indirect effect of roads is that road avoidance leads to underutilization of habitats that are otherwise high quality."

Wisdom, Michael J., Richard S. Holthausen Ph.D. Barbara C. Wales Ph.D., Christina D. Hargis Ph.D. Victoria A. Saab Ph.D., Danny C. Lee Ph.D. Wendel J. Hann Ph.D. Terrell D. Rich, Mary M. Rowland, Wally J. Murphy, and Michelle R. Eames "Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-Scale Trends and Management Implications Volume 2 – Group Level Results." USDA Forest Service, PNW-GTR-485, May 2000. http://maps.wildrockies.org/ecosystem_defense/Science_Documents/Wisdom_et_al_2000/Vol_2a.pdf

Road Construction Opposing View #55 - "According to the DEIS, the Forest now manages a total of 5,914 miles of roads across the Forest. Scientific literature has established that roads have numerous widespread, pervasive and, if left untreated, long-lasting biological and physical impacts on aquatic ecosystems that continue long after completion of construction. (Angermeier et al. 2004). Roads increase surface water flow, alter runoff patterns, alter streamflow patterns and hydrology, and increase sedimentation and turbidity. Roads are the main source of sediment to water bodies from forestry operations in the United States. (US EPA 2002). Road construction can lead to slope failures, mass wasting and gully erosion. Road crossings can act as barriers to movement for fish and other aquatic organisms, disrupting migration and reducing population viability. (Schlosser and Angermeier 1995). Chemical pollutants that enter streams via runoff, such as salt and lead from road use and management, compound these impacts. Most of these adverse effects are persistent and will not recover or reverse without human intervention. The techniques for road remediation are well established, agreed upon and readily available. (Weaver et al. 2006)." (Pg. 2)

Wright, Bronwen, Policy Analyst and Attorney Pacific Rivers Council Excerpt from a May 11, 2009 letter to the Rogue River-Siskiyou National Forest Travel Management Team http://www.pacificrivers.org/protection-defense/comment-letters/Rogue%20River%20Siskiyou%20TMP%20DEIS.pdf

Road Construction Opposing View #56 - "Fires do not leave a large road network in place (assuming the blaze was not suppressed otherwise there may be dozer lines, etc.). Logging creates roads that fragment habitat and generally increase human access, both of which affect the use of the land by wildlife. Moreover, roads and logging equipment can become vectors for the dispersal of weeds."

Wuerthner, George 2008 "Ecological Differences between Logging and Wildfire" http://wuerthner.blogspot.com/2008/12/ecological-differences-between-logging.html

***Response**: Forest Service policy is for that for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative (FSH 1909.15).*

*We agree that roads can negatively impact forest resources including wildlife, aquatic systems, water quality, and may increase invasive species colonization. In forested watersheds that contain roads, the roads are frequently a major source of sediment that reaches streams and other aquatic features. However, for this project proposed construction is not aimed at accessing large areas of unroaded forest for timber harvest, but rather this project proposes to construct short segments of road that would access previously logged areas that are generally already roaded. NEPA analysis for the project is intended to disclose the potential for impacts of road construction to allow for an informed decision. Significant impacts are not expected from the project proposal as shown in the specialist reports for the project and as summarized in Chapter 3 of the EIS.*

*Since road construction is recognized as a potential source of negative effects upon a variety of forest resources and values, the decision to proceed with any new road construction occurs only after careful consideration of the beneficial and adverse effects of additional roads. Largely in response to information derived from research, the location, design standards and construction techniques associated with current road construction, the risks and adverse effects are expected to be minimized compared to those occasionally reported for existing roads that were constructed with less concern for their environmental effects.*

*The road construction and reconstruction of roads with this project would include application of site-specific standards and guidelines for resource protection as described in the Eldorado National Forest Land and Resource Management Plan (LRMP) and Best Management Practices (BMPs). Forest Service BMPs currently incorporated into road construction and reconstruction activities on the Eldorado National Forest include:*

- *Road surfacing (road rocking, chip sealing, etc..) is oftentimes included in reconstruction activities to not only provide better traffic usage; but also to prevent and control erosion from the road surface*
- *Road drainage controls are being incorporated into designs that are intended to:*
  - *Reduced erosive flows in ditches by providing frequent cross-drains to relieve ditch flows;*
  - *Avoid water movement down the road by dispersing the drainage quickly by crowning or outsloping the road surface;*
  - *Disperse drainage water (that often carries sediment) onto stable forested slopes before ditches discharge into waterways;*
  - *Ensure new and replaced stream crossings safely pass extreme events when constructed or reconstructed (i.e. 100-year flood event).*

*As discussed in the hydrology report for the project (Norman and Tolley, 2013)*

> *"Many roads to be reconstructed or maintained create the short term potential for sediment generated by road work to reach aquatic features. Implementation of best management practices, however, would be expected to minimize the effects of road work on aquatic features. Based on best management practices evaluations conducted from 2008 through 2012 , on road surface, drainage, and slope protection (6 evaluations), and stream crossings (3 evaluations), BMPS were rated effective for 8 out of the 9 evaluations, with one evaluation rated at risk (Query of USFS Region BMPEP Database, 2013)."*

*Additionally, Riparian Conservation Objectives that maintain or enhance Riparian Conservation Areas within the project area have been developed by members of the interdisciplinary team from hydrology, aquatic biology, soils and botany. Current practice is to restore key abandoned or no longer useful roads to a "hydrologically neutral" condition. Effects of road construction, reconstruction, and decommissioning are discussed and disclosed in individual specialist reports for the project and are included in the project file.*

*Anadromous fish are not present in the project area and would not be impacted by project activities.*

**DA-Attachment 4-C** Negative socio-economic effects of road construction

Road Construction Opposing View #6 - "Many of the conclusions and assumptions contained in the Roads Report are based on analysis of the positive contributions of roads. Negative socio-economic effects of roads have been, in large part, glossed over. The general view expressed in the Roads Report is that overall, roads make a positive socio-economic contribution."

"The Socio-Economic Effects section has been constructed to overwhelmingly support the contention that the benefits of roads outweigh the costs. In order to arrive at such a conclusion, however, certain important economic costs and concepts have been omitted."

"A serious problem with the Roads Report is its lack of discussion concerning the economic costs arising from the negative ecological effects of roads. Despite overwhelming scientific data linking roads and sedimentation (Bennett 1991; Grayson et al. 1993; Lyon 1984; Megahan 1980; McCashion and Rice 1983; Wade 1998; Williams 1998), the socio-economic costs of mitigating the effects of this sedimentation receive no mention in the Roads Report. Such costs are central to and should be included in any socio-economic assessment of forest roads."

***Response:*** *Forest Service policy is for that for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative (FSH 1909.15).*

*Social and economic analysis for the project show that there would be minor increases in employment and economic activity associated with the proposed road work. As sedimentation from roads is expected to be reduced by installation of BMPs where roads are currently not maintained, access to areas would be improved for recreation on roads open to public use and road construction is limited and has been designed to minimize potential erosion issues and sedimentation as shown in the hydrology and soils reports for the project, negative social and economic impacts from road work proposed with this project is not expected.*

*Furthermore road improvements are expected to increase potential for prescribed fire implementation intended to improve ecosystem function and sustainability and response time for firefighters that can reduce potential for negative social and economic impacts that would likely result from a catastrophic fire in the area.*

**DA-Attachment 4-D** Citations specific to other reports and not relevant to this project

Road Construction Opposing View #7 - "The present road system constitutes a legacy of current and potential sources of damage to aquatic and riparian habitats, mostly through sedimentation, and to terrestrial habitats through fragmentation and increased access" (Amaranthus et all 1985)."

"The failure of the Report to properly address mitigation costs associated with the ecological effects is a serious problem that needs to be addressed in future drafts. Similarly, passive-use values need to be taken seriously and considered throughout the Roads Report. In order to rectify these problems, most of the Socio-Economic Effects subsections will have to be reworked. Failing to do so, the Roads Report will paint an incomplete picture of the costs and benefits associated with the Forest Service's road program."

Brister, Daniel. "A Review and Comment on: Forest Service Roads: A Synthesis of Scientific Information, 2nd Draft, USDA Forest Service." December 1998.
http://www.wildlandscpr.org/forest-service-roads-synthesis-scientific-information-socio-economic-impacts

Road Construction Opposing View #17 - "The authors warned that cutting roads into current roadless areas could bring much more harm to wildlife, soil and fisheries than the beetle-killed trees pose to the forest."

Frey, David "Logging Won't Halt Beetles, Fire, Report Says" NewWest.net, 3-03-10
http://www.newwest.net/topic/article/logging_wont_halt_beetles_fire_report_says/C41/L41/

***Response:*** *Citations dealing with negative effects of road construction and forest roads in general are dealt with in other areas of this response to comments. This specific comment appears to be addressing a specific report and faults within that report and is therefore not relevant to this proposal.*

**DA-Attachment 4-E** Citations regarding road building in roadless areas.

Road Construction Opposing View #28 - "It is indisputable that roads are one of the greatest threats to the ecological integrity of forested systems and associated river, wetland, lake, and coastal ecosystems. Yet, the USFS has failed to adopt a policy that mandates reversing the worst ecological effects of roads, or that precludes incursion of roads into roadless areas. Despite widespread recognition of these facts, the USFS diverts staff and money to extraordinarily costly salvage logging projects at the expense of reducing the extent of the road network or undertaking needed fine-fuels reductions in unburned forests."

Karr, James R. Ph.D., Christopher A. Frissell Ph.D., Jonathan J.
Rhodes, David L. Perry Ph.D. and G. Wayne Minshall Ph.D.
Excerpt from a letter to the Subcommittee on Forests & Forest Health
U.S. House of Representatives. 3 July, 2002.
http://www.nativeforest.org/campaigns/wildfire_info_center/letter_from_beschta.htm

***Response:*** *Road construction, reconstruction, or use is not proposed in a roadless area, therefore comments relevant to road construction in roadless areas are not relevant to this decision.*

**DA-Attachment 4-F** Citations regarding impacts to wildlife not found in the project area.

Road Construction Opposing View #37 - "Road construction in remote areas appears to be the major long term impact of resource extraction industries and the most significant problem facing grizzly bears in most locations. Open roads are an influence in all 5 ways that people affect bears. Vehicles on roads can harass bears, displace them from quality habitats, and cause reduced bear use of altered habitats, such as cutting units. Bears that are displaced from roads may cause social disruption in areas away from roads. Finally, roads permit access for many people and some of these will shoot bears." (Pg. 62)

McLellan, Bruce N. "Relationships between Human Industrial Activity and Grizzly Bears" Bears: Their Biology and Management, Vol. 8 International Conference on Bear Research and Management February 1989 (1990), pp. 57-64
http://www.bearbiology.com/fileadmin/tpl/Downloads/URSUS/Vol_8/McClellan_8.pdf

Road Construction Opposing View #41 - "Numerous studies have reported lower densities of breeding Ovenbirds (Seiurus aurocapillus) adjacent to forest edges. However, none of these studies has considered habitat use and reproductive success to address mechanisms underlying the observed pattern, and most were conducted in fragmented landscapes and ignored juxtapositions of forest with narrow openings such as roads. We studied the influence of forest roads on Ovenbird density in an extensively forested region of Vermont, evaluating habitat use and reproductive success relative to mechanisms proposed to explain the density-edge relationship. Territory densities on seven study plots were 40% lower within edge areas (0 to 150 m from unpaved roads) than within interior areas (150 to 300 m from roads). We simulated the distribution of Ovenbird territories and concluded that passive displacement, where birds perceive habitat interfaces as boundaries and limit their territories entirely to forest habitat, did not account for the observed density-edge pattern. Territory size was inversely related to distance from roads, providing an alternative explanation for reduced densities near edges and suggesting that habitat quality was higher away from roads. Pairing success was lower within edge areas than within interior zones, but the difference was not statistically significant. The proportion of males that produced fledglings did not differ between edge and interior areas. We conclude that habitat quality for Ovenbirds may be lower within 150 m of unpaved roads in extensive forested landscapes, affecting territory density and possibly reproductive success."

Ortega, Yvette K.; Capen, David E. 1999. "Effects of forest roads on habitat quality for Ovenbirds in a forested landscape" Auk. 116(4): 937-946.
http://www.fs.fed.us/rm/pubs_other/rmrs_1999_ortega_y001.html

***Response:*** *Forest Service Manual (FSM) 2672.42 directs that a biological assessment (BA) be prepared for all proposed projects that may have effects upon federally proposed, threatened, and endangered species to ensure that project decisions do not adversely affect federally listed species. In addition, FSM 2670.32 directs that a biological evaluation (BE) be prepared to evaluate the effects of proposed projects*

*on Forest Service Region 5 designated sensitive species to ensure that project decisions do not result in the loss of species viability or create significant trends towards federal listing. Wildlife reports for the project analyze the potential effects of the proposed project for federally listed threatened, endangered, and proposed terrestrial species, and Region 5 listed sensitive terrestrial species.*

*Neither grizzly bears nor ovenbirds are in or near the project area and will not be impacted by project activities.*

**DA-Attachment 4-G** Citations of general opinion statements

Road Construction Opposing View #12 - "Roads often cause serious ecological impacts. There are few more irreparable marks we can leave on the land than to build a road."

Dombeck, Mike Ph.D., US Forest Service Chief, 1997-2001 Remarks made to Forest Service employees and retirees at the University of Montana. February 1998. https://www.uwsp.edu/cnr/gem/Dombeck/MDSpeeches/CD%20COPY/Chief%20Mike%20Dombeck%27s%20Remarks%20to%20Forest%20Service%20Employees%20and%20.htm

Road Construction Opposing View #25 - "Last winter was unusually wet in the Pacific Northwest. The result was landslides all over caused by logging roads; five people died, spawning streams were ruined, water supplies were contaminated and the flooding was tremendously aggravated. According to David Bayles, conservation director of the Pacific Rivers Council, aerial surveys documented more than 650 landslides in February in Washington and Oregon alone. The stupidest and most dangerous practice is allowing logging roads on steep slopes — that's really asking for it.

You may ask yourself why the taxpayers are expected to pony up to build roads for profitable logging companies. Build roads for the timber companies in order to stimulate the U.S. logging, paper and building industries. There's just one problem. A lot of U.S. logs get shipped overseas, mostly to Japan. We're actually subsidizing Japanese companies while doing terrible damage to our environment and not helping the U.S. job scene much except when it comes to cutting

Start with the assumption that the U.S. Forest Service a component of the Department of Agriculture, is simply an auxiliary branch of the timber industry and you'll pretty much have the picture of what's going on. Last winter, the Forest Service refused a bid at a timber auction from an environmentalist who wanted to save, not harvest, a stand of evergreens in the Okanogan National Forest in Washington. Instead, the Forest Service accepted a bid of $15,000 from a logging company that cut 3.5 million board-feet of lumber in that stand. Try to find a price like that at Home Depot."

Ivins, Molly Creators Syndicate, August 3 1997 08 03
http://www.creators.com/opinion/molly-ivins/molly-ivins-august-3-1997-08-03.html

Road Construction Opposing View #39 - "Today, addressing the adverse impacts of forest roads is consistently identified as one of the highest watershed restoration priorities in U.S. forests—in many forested watersheds in the western United States there is a greater road density than stream density. It

is simply irrational to spend millions of dollars subsidizing further forest road construction when we are simultaneously spending millions of dollars to offset detrimental effects associated with similar actions in the past."

Montgomery, David Ph.D., Statement at a Press Conference with Senator Robert Torricelli about S. 977 and HR 1376), the Act to Save America's Forests April 28, 1998, U.S. Capitol http://www.saveamericasforests.org/news/ScientistsStatement.htm

***Response:*** *Citations provide general opinions about impacts of roads and of funding of road construction. Analyses of impacts of road work included in the project have been conducted consistent with direction in FSH 1909.15.*

**DA-Attachment 4-H** Increased fire intensity in roaded areas in the Columbia Basin
Road Construction Opposing View #22 - "Fires in the roaded areas are more intense, due to drier conditions, wind zones on the foothill/valley interface, high surface-fuel loading, and dense stands."

Hann, W.J. et al. 1997. Landscape dynamics of the Basin. Pp. 337-1,055 in: Quigley, T.M. and S.J. Arbelbide (eds.) An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins: Volume II. USDA Forest Service, PNW-GTR-405 http://www.fs.fed.us/pnw/pubs/gtr405/pnw_gtr405aa.pdf

***Response:*** *This report is an assessment of site specific conditions in the Columbia Basin. It is unclear how this assessment relates to the Blacksmith project. Treatments proposed in the Blacksmith project area would reduce surface fuel loading and stand density. The proposed roadwork provides greater access to the Forest in the event of a fire, allowing firefighters to reach the fire more quickly. Road systems are commonly used in fire suppression as control lines to contain wildland fires. Within the Blacksmith project area, treatments adjacent to road systems include mechanical treatments and prescribed fire with the objective to reduce surface and ladder fuels. All action alternatives reduce surface fuel loadings and dense stands; the Blacksmith Analysis discusses the effects of altering fuels effectively reducing surface fire behavior and subsequent crown fire initiation.*

**Opposing Views Attachment #5; Insect Activity is a Beneficial Natural Disturbance Event in the Forest**

**DA-Attachment 5-A** Citations with definitions of forest health

Insect Opposing Views #1 - "Defining forest health has proven to be something akin to shooting at a moving target. Different groups and different folks often mean different things when they use the term. Attempts to formulate a standard "one size fits all" definition have occupied untold hours of bureaucratic, professional and academic meetings, and consensus remains elusive. Why? To begin with, when we talk about forest health, it is necessary to identify the scale of our focus. Are we talking about a pine plantation, a particular forest ownership, a county, a state, a region, etc.? Such scale is not always defined, and is often prioritized differently by different people for varying reasons. Another reason seems to be that one's concept of "healthy" is often inextricably linked to what he or

she desires from the forest. What may be undesirable to forest managers emphasizing timber production may well be desirable to others interested primarily in wildlife habitat or biodiversity, and vice versa."

Barnard, E. L. Ph.D. "Forest Health Fundamentals" from Forest Management, 2004
http://www.fl-dof.com/forest_management/fh_fundamentals.html

Insect Opposing Views #6 - "The definition of forest health is continually being reevaluated. For instance, where once forest fires and insect infestations were seen as indicators of unhealthy forests, and thus great effort was made to suppress them, forest landowners and managers today are appreciating the long-term contributions that these conditions can make to a healthy ecosystem. It may be said that the standards by which we measure forest health are determined by the objectives we aspire to. Forests managed for maximum timber yield will require different criteria for judging forest health than those managed for old-growth forest purposes. Likewise, the health of forests adjacent to or in urban communities will be judged with criteria that are quite different from those used to judge forests in rural areas where population densities are quite low."

Board on Agriculture. 1998 "Forested Landscapes in Perspective: Prospects and Opportunities for Sustainable Management of America's Nonfederal Forests"
http://books.nap.edu/openbook.php?record_id=5492&page=205

Insect Opposing Views #11 - "Before discussing the above points in more detail, it is important to specify what the term health as applied to a forest ecosystem means to me; I believe my views reflect those of most ecological scientists. A healthy system is one that retains the integrity of its basic structure and processes, including viable populations of indigenous species. Some level of disease and tree death is normal and beneficial in forests; ecosystem health is not so much the absence of disease and death as it is the ability to contain these natural forces within certain bounds and the robustness to resist or recover quickly from environmental stresses. These system properties of "resistance" and "resilience" are closely associated in turn with species diversity and in particular with the multiplicity of interactions among species that compose the system. Although healthy trees are prerequisite to healthy forest ecosystems, health encompasses much more than trees, and forest health correlates much more closely with structure and processes than with how fast trees are growing."

Perry, David A. Ph. D. Testimony at a Senate Field Hearing on Forest Health
August 29, 1994 http://www.subtleenergies.com/ormus/Fire/D_PERRY.htm

Insect Opposing Views #14 - "Although it may be relatively easy to ascertain whether an individual tree is healthy or not, the concept of "forest health" is very ambiguous. The presence of unhealthy trees does not necessarily imply that the forest as a whole is unhealthy. On the contrary, standing dead trees and fallen logs (coarse wood) play important roles in wildlife habitat, soil development, and nutrient cycling, and are a defining characteristic of old-growth forests. Bark beetle outbreaks rarely kill all of the trees in a stand, because they preferentially attack the larger trees and generally ignore the smaller trees. These smaller trees may be hidden by the red needles of the large killed trees during the peak of the outbreak, such that one often has an impression of total tree mortality.

However, once those needles fall it usually becomes apparent that many small and moderate sized trees survived the outbreak. These smaller trees may grow two to four times more rapidly after the outbreak than they did before, because they are no longer competing with the big trees for light, water, and nutrients (Romme et al. 1986). In mixed forests of lodgepole pine and aspen, the aspen may grow more vigorously after beetles kill the dominant pine trees. Even when all of the trees are killed, as in a severe forest fire, the result usually is stand regeneration, as described above for lodgepole pine. Thus, from a purely ecological standpoint, dead and dying trees do not necessarily represent poor "forest health." They may instead reflect a natural process of forest renewal." (pg.11)

Romme, W.H., J. Clement, J. Hicke, D. Kulakowski Ph.D. L.H. MacDonald, T.L. Schoennagel Ph.D., and T.T. Veblen. 2006 "Recent Forest Insect Outbreaks and Fire Risk in Colorado Forests: A Brief Synthesis of Relevant Research"
http://www.cfri.colostate.edu/docs/cfri_insect.pdf

***Response**: The need for action discusses the relationship between the desired condition and the existing condition in order to answer the questions concerning a need for this project relative to overall forest health of the project area (FSH 1909.15). The 2004 Sierra Nevada Forest Plan Amendment identifies the desired conditions for the various land allocations on the Eldorado NF. Goals for management include reducing threats to communities and wildlife habitat from large, severe wildfires, increasing stand sustainability by restoring a species composition and structure that is more resilient, and re-introducing fire into fire-adapted ecosystems. The Forest Plan decision includes managing hazardous fuels in and around communities combined with strategic placement of fuels treatments across broad landscapes to modify wildland fire behavior. The desired conditions for the project area and the need for treatment to move landscapes toward that condition were based upon direction in the Forest Plan.*

*The Sierra Nevada mixed conifer stands that compose the project area are not similar to the lodgepole pine/ aspen stands mentioned in the comments, above. When the larger overstory pines in the mixed conifer forest are killed by bark beetles it is typically the shade tolerant white fir and incense cedar that have grown in the absence of fires in these systems that remain in these stands and which further contribute to undesirable fuel ladder and species composition conditions in these stands. There is no general disagreement between the forest health discussion presented in the comments above and the broad forest health concepts expressed in the Sierra Nevada Forest Plan Amendment or the Blacksmith EIS.*

**DA-Attachment 5-B** Citations that insects are a natural disturbance process and benefit the ecosystem

Insect Opposing Views #2 - "Forests change. Disturbance including insects and fires are frequently part of the regenerative process. Rarely is it possible or desirable to maintain a forest at some seemingly idyllic stage of succession. Forest health - including services provided such as water - require managing to maintain natural processes. In the overgrown western U.S., fires and insects are resetting the system in response to years of fire suppression and changing climate. They are doing so in a way that will lead to adaptive and renewed forests, with far improved outcomes than logging could ever hope to achieve. Bush's "Forest Health" initiative will only exacerbate the negative

situation. These forests are still extensive and large enough that letting them be is the best forest health prescription."

Barry, Glen Ph.D. "Insect Attacks May Benefit Colorado Forests" Forests.org, January 29, 2004 http://forests.org/blog/2004/01/insect-attacks-may-benefit-col.asp

Insect Opposing Views #3 - "Mountain pine beetles, Ips beetle species, red turpentine beetles, and other wood boring beetles are all naturally occurring insects on the Black Hills, yet the USFS perceives these insects as a threat to the Forest ecosystem. These insect species do diminish the cash value of some conifers. Accordingly, concerted efforts have been made to rid public forests of what are called "pest insects". However, such a strategy is not wise or feasible.

Insects including those mentioned above are integral components of healthy forest ecosystems. These native species do less damage to the forest than the commercial logging program (which completely removes trees and nutrients from the ecosystem). In addition, these insect species are invaluable to the BHNF forest ecosystem. Insects help decompose and recycle nutrients, build soils, maintain genetic diversity within tree species, generate snags and down logs required by wildlife, and provide food to birds and small mammals. By feeding upon dead or dying trees, wood borers and bark beetles provide food to insect gleaning species of birds (such as the black backed woodpecker which is listed as a MIS species on this Forest), create snags that may be utilized by cavity nesting birds in the future and overall are invaluable catalysts in forest evolution - often aiding immensely in the regrowth of forest after fires, blowdowns or other naturally occurring stand removing processes. The potentially significant direct, indirect, and cumulative impacts upon insects and upon the niche of insects in the BHNF forest ecosystem should be thoroughly analyzed in the FEIS."

Black, Scott Hoffman Ph.D., Entomologist/Ecologist and Executive Director The Xerces Society Excerpt from a 2008 comment letter to Alice Allen Hell Canyon Ranger District Black Hills National Forest http://www.xerces.org/wp-content/uploads/2008/09/black_hills_comments.pdf

Insect Opposing Views #4 - "Insects, including those that feed on and sometimes kill trees, are integral components of healthy forest ecosystems. They help decompose and recycle nutrients, build soils, maintain genetic diversity within tree species, generate snags and down logs that wildlife and fish rely on, and provide food for birds and small mammals. Although insects have been a part of the ecology of temperate forests for millennia, many in the timber industry see them only as agents of destruction.

Some foresters believe the solution to the problem is increased logging. A review of over three hundred papers on the subject reveals that there is little or no evidence to support this assumption. There is an urgent need for federal and state agencies and land managers to reevaluate their current strategy for managing forest insects—which often relies on intensive logging—and to adopt a perspective that manages for forest ecosystem integrity."

Black, Scott Hoffman Ph.D., Entomologist/Ecologist and Executive Director, The Xerces Society for Invertebrate Conservation 2005 "Logging to Control Insects: The Science and Myths Behind Managing Forest Insect 'Pests'" http://www.xerces.org/guidelines-logging-to-control-insects/

Insect Opposing Views #7 - "Television commercials tell us that the only good bug is a dead bug. But stop a moment and think about all the important jobs insects do: they pollinate plants including trees, provide food for fish, birds, and other creatures, help decompose dead material, and make nutrients available to the forest. Insects keep our forests healthy."

Calvert, Jeffrey Ph.D. "A healthy forest needs bugs" California Forest Stewardship Program, 2002 http://ceres.ca.gov/foreststeward/html/bugs.html

Insect Opposing Views #9 - "Insects are a part of the complex forest ecosystem. Like all parts of the ecosystem they have a role to play and they interact with many other components. This group of organisms is incredibly diverse and their ecosystem functions are equally diverse. The ecological role of insects ranges from benefactor to killer, with the beneficial insects being the most abundant.

Pollination is an important role played by some insects. Wasps and bees pollinate flowering trees and shrubs.

Speeding up decay is another insect function. Insects such as ants, termites and wood boring beetles bore into the wood of dead trees, speeding up the invasion of wood decaying microbes.

Insects speed up nutrient cycling within the soil. Insects such as collembolans, thysanurans, beetles, and flies feed on organic matter and fungi, speeding the flow of nutrients to the soil.

Other insects can act as predators and parasites of herbivorous insect pests. Under normal conditions these natural enemies control these pest populations.

Insects also act as food sources for many insectivorous birds, amphibians and mammals.

These multiple roles indicate the complexity of insect functions in the forest ecosystem. Insects are involved in the ecological processes of the forest, including in forest stability, succession and productivity.

Over time, the insect populations of the host tree, attacking insects and insect enemies fluctuate and end up regulating the composition and abundance of each. This impacts ecosystem stability.

By feeding on unhealthy trees, insects help to re-cycle the nutrients from the dying trees to the healthy survivors. This maximizes the productivity of the average tree.

The number of beneficial or non-harmful insect species in a forest is large. They play many essential roles within the forest ecosystem."

"Forest Protection – Insects" Canfor Corporation, 2007
http://www.canfor.com/treeschool/library/files/insects.asp

Insect Opposing Views #12 - "Research has already shown that insects are a key in cycling nutrients, speeding decomposition and building soil fertility. It now appears they do far more than that.

It's becoming clear that major insect attacks are a powerful tool to shape the very species and structure of forests into one that's appropriate for the terrain and climate - and one that's sustainable.

In Oregon we've viewed the major insect epidemics simply as disasters. In fact, those destructive outbreaks are having an effect that's roughly comparable to fire. In some ways they're doing the forest underthinning that fire would have done and we should have done."

Defoliating and sap-sucking insects affect nutrient turnover. Wood boring insects penetrate bark and provide access for decomposers and water, accelerating decomposition. Outbreaks can open holes in the forest canopy. The surviving trees get a nutrient burst to improve their growth and health.

Something has to establish a balance between the available water, nutrients and the demands of plants. We finally came to realize that fire was a big part of that. Now we need to change our view of insects, because they too play a major role."

Schowalter, Tim Ph.D., "Insect epidemics a natural path to forest health?"
27-May-1997, OSU News http://oregonstate.edu/dept/ncs/newsarch/1997/May97/goodbugs.htm

Insect Opposing Views #13 - "Native insects and diseases are intrinsic and necessary components of most terrestrial ecosystems. These and other natural disturbances, such as fire, are the drivers of forest diversity, structure, and function. Although at times devastating to the forest, they are necessary for the sustainability of forests (Aber and Melillo 1991, Attiwill 1994). Insects and diseases do cause economic harm. For the period 1982-1987, losses due to insects and diseases in Canada were estimated at over 100 million m3 annually or one third of the annual harvest (Hall and Moody 1994). Forest managers must balance volume loss without interfering with the necessary ecological functions that these agents provide to sustain a healthy forest."

"Native Forest Insects and Diseases" A publication of the Canadian Forest Service, 2003
http://www.health.cfs.nrcan.gc.ca/BorealShield/nativeInsectsAndDiseases_e.html

Insect Opposing Views #15 - "Beyond that, these insect attacks are actually nature's mechanism to help restore forest health on a long-term basis and in many cases should be allowed to run their course, according to Oregon State University scientists in a new study published this week in the journal Conservation Biology in Practice.

Native insects work to thin trees, control crowding, reduce stress and lessen competition for water and nutrients, the researchers found. Some levels of insect herbivory, or plant-eating, may even be good for trees and forests, and in the long run produce as much or more tree growth.

'There is now evidence that in many cases forests are more healthy after an insect outbreak,' said Tim Schowalter, an OSU professor of entomology. 'The traditional view still is that forest insects are destructive, but we need a revolution in this way of thinking. The fact is we will never resolve our problems with catastrophic fires or insect epidemics until we restore forest health, and in this battle insects may well be our ally, not our enemy.' "

View of forest insects changing from pests to partners
Bio-Medicine.org, 2001 http://news.bio-medicine.org/biology-news-2/View-of-forest-insects-changing-from-pests-to-partners-8940-1/
Science Blog http://www.scienceblog.com/community/older/2001/C/200113890.html

Insect Opposing Views #22 - "The mountain pine beetle is a native insect, having co-evolved as an important ecological component of western pine forests. The inter-relationship between beetle-caused mortality and subsequent fire has resulted in a basic ecological cycle for many western forests (Schmidt 1988).

Some pines species, such as lodgepole pine, are maintained by periodic disturbances. The lodgepole pine forest-type1 typically is an essential monoculture of even-aged trees that were initiated by a catastrophic, stand-replacing fire. Without the influence of fire (Fig. 1B), lodgepole pine would be lost over much of its native range (Brown 1975, Lotan et al. 1985). Fire serves to prepare the seedbed, releases seeds from the serotinous cones (triggered to release seeds by heat of a fire), and eliminates more shade-tolerant species such as spruce or fir that would eventually out-compete and replace the early seral lodgepole pine."

Logan, Jesse A. Ph.D. and James A. Powell Ph.D. Ghost Forests, Global Warming and the Mountain Pine Beetle (Coleoptera: Scolytidae) AMERICAN ENTOMOLOGIST • Fall 2001
http://www.usu.edu/beetle/documents/Logan_Powell01.pdf

***Response:*** *We do not disagree that insects and wildlife are a natural process in the forest, however higher than desired levels of insect mortality resulting from over dense stands jeopardize management objectives set forth in the Forest Plan to provide for the multiple uses on the forest and provide for sustainability of the forest landscape.*

*The citations presented in this package provide general information on insect attack in the Interior Mountain region characterized by vegetation types that are quite different from those in the Sierra Nevada. Specific information in the Sierra Nevada indicates an increase in mortality of mixed conifer species especially ponderosa pine, sugar pine and Jeffrey pine. This increase (Bouldin 1999, van Mantgem and Stephenson 2007, Lutz et al. 2009) appears to be linked to fire suppression (Bouldin 1999, Lutz et al. 2009) and climate change (van Mantgem and Stephenson 2007, van Mantgem et al. 2009). Fire suppression has led to a high density of trees causing moisture stress and consequently more beetle activity (Fettig 2007). Other insects and pathogens have also capitalized on the more even aged dense forest structure. In a natural mixed severity fire regime, interactions with the more heterogeneous landscape with lower stand densities would have reduced the incidence of beetle attack. In fact, beetles*

*have replaced fire as a principle agent of mortality. A comparison to reference sites (San Pedro Martir, Baja CA) showed that in areas with a lower stand density trees were not moisture stressed and mortality was substantially reduced (Savage 1997, Stephens and Gill 2005). Future climate predictions support increased moisture stress to trees and increased bark beetle populations due to a milder climate could potentially increase mortality.*

*The Sierra Nevada mixed conifer forest stands which have an ecological structure that is maintained by pockets of endemic insect mortality and low and mixed severity wildfire are not similar to lodgepole pine stands, which are typically dominated by large areas of even aged forest resulting from high severity, stand replacing fires. A more homogenous structure has become prevalent in the mixed conifer forest as fire suppression and past logging practices have reduced the typical heterogeneity of these forests, therefore this project proposes to increase landscape heterogeneity, which is proven to decrease potential for bark beetle epidemics at the landscape level. Therefore treatments based on PSW-GTR 220 and PSW-GTR 227 have been designed consistent with the Sierra Nevada Forest Plan amendment to treat the landscape while reducing immediate impact the California spotted owl and other late seral wildlife use of the area.*

*MIS are animal species identified in the SNF MIS Amendment Record of Decision (ROD) signed December 14, 2007, which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). Guidance regarding MIS set forth in the Eldorado National Forest LRMP as amended by the 2007 SNF MIS Amendment ROD directs Forest Service resource managers to (1) at project scale, analyze the effects of proposed projects on the habitat of each MIS affected by such projects, and (2) at the bioregional scale, monitor populations and/or habitat trends of MIS, as identified in the Eldorado National Forest LRMP as amended. Project-level effects on MIS habitat are analyzed and disclosed as part of environmental analysis under the National Environmental Policy Act (NEPA). This involves examining the impacts of the proposed project alternatives on MIS habitat by discussing how direct, indirect, and cumulative effects will change the habitat in the analysis area. Blackbacked woodpecker is an MIS for burned forest habitat and therefore are identified in the Blacksmith analysis as an "MIS whose habitat is not in or adjacent to the project area and would not be affected by the project".*

**DA-Attachment 5-C** Citations not relevant to the proposal

> Insect Opposing Views #5 - "Even forest thinning, which is widely promoted as a solution by reducing tree susceptibility to outbreaks, has had mixed results and is unlikely to stem bark beetle epidemics on a large landscape scale, especially during drought cycles. Further, this type of thinning would not be a one-time treatment, but would require regular thinning of all treated stands every decade or so because thinning tends to promote rapid growth of understory vegetation, making it a potential fuel ladder. Moreover, too much thinning can moderate stand climates, which may be favorable to some beetles, and increase wind speeds adding to crown fire spread."
>
> "Scientists, land managers and residents of Colorado are concerned about how wildfire might affect our forests and communities. If the goal is to protect communities, fire-mitigation efforts should be focused around those communities and homes, not in remote and ecologically valuable areas."

"These forests may look different to us, but beetle-affected forests are still functioning ecosystems that provide food and shelter for animals, cool clear water for fish and humans, and irreplaceable refuges for wildlife from the effects of logging, road building and climate change." (Pp 23 and 24)

Black, S. H. Ph.D., D. Kulakowski Ph.D., B.R. Noon Ph.D., and D. DellaSala Ph.D. 2010. "Insects and Roadless Forests: A Scientific Review of Causes, Consequences and Management Alternatives." National Center for Conservation Science & Policy, Ashland OR.
http://nccsp.org/files/Insect%20and%20Roadless%20Forests.pdf

Insect Opposing Views #16 - "Pine beetle suppression projects often fail because the basic underlying cause for the population outbreak has not changed (DeMars and Roettgering 1982). Typically, if a habitat favorable to high populations of western pine beetle persists, suppression—by whatever means—will probably fail. In summary, once bark beetles reach epidemic levels and cause extensive tree mortality, treatments aimed at reducing densities of the beetles are futile (Wood et al. 1985).

Logging can also lead to heightened insect activity. Soil and roots can be compacted following logging, leading to greater water stress. Soil damage resulting from logging with heavy equipment can increase the susceptibility of future forests to insects and disease (Hagle and Schmitz 1993, Hughes and Drever 2001). Salvage logging after insect outbreaks also can make matters worse by removing snags, parasites, and predators from the forest system (Nebeker 1989). Outbreaks could then be prolonged because of a reduction in the effectiveness of natural enemies (Nebeker 1989).

Standing dead trees are important for several birds that feed on mountain pine beetles; these birds are important regulators of endemic beetle populations that keep the risk of epidemics down (Steeger et al. 1998). Widespread removal of dead and dying trees eliminates the habitat required by bird species that feed on those insects attacking living trees, with the result that outbreaks of pests may increase in size or frequency (Torgerson et al. 1990).

Logged stands have less diverse architecture and overall lower seed production than untouched stands. Consequently, logged stands have lower arthropod and small mammal diversity than undisturbed stands (Simard and Fryxell 2003). Mass annihilation of wood-decaying macrofungi and insect microhabitats from logging has an extremely detrimental effect on arthropod diversity (Komonen 2003), including on the natural enemies of pest insects. Sanitation and salvage logging differ from natural disturbance in their effects and tend to decrease habitat complexity and diversity, which can lead to an increase in insect activity (Hughes and Drever 2001).

Large-scale efforts for beetle control are economically and ecologically expensive, and the uncertain benefits of control efforts should be weighed carefully against their costs (Hughes and Drever 2001). Former U.S. Forest Service Chief Jack Ward Thomas, in testimony before the U.S. Senate Subcommittee on Agricultural Research, Conservation, Forestry, and General Legislation on August 29, 1994, acknowledged that "the Forest Service logs in insect-infested stands not to protect the ecology of the area, but to remove trees before their timber commodity value is reduced by the insects."

Black, S.H. Ph.D. 2005. Logging to Control Insects: The Science and Myths Behind Managing Forest Insect "Pests." A Synthesis of Independently Reviewed Research. The Xerces Society for Invertebrate Conservation, Portland, OR.
http://www.xerces.org/wp-content/uploads/2008/10/logging_to_control_insects.pdf

Insect Opposing Views #20 - "Although the scale of the recent beetle outbreak is unprecedented in modern times, experts note that insect outbreaks and fires are a natural part of Western forest ecosystems. As such, the report found no causal link between insect outbreaks and the incidence of wildfire.

Moreover, the authors found that tree cutting "is not likely to control ongoing bark beetle outbreaks," nor will it be "likely to alleviate future large-scale epidemics."

"Despite nearly 100 years of active forest management to control the mountain pine beetle, there is very little evidence to suggest that logging is effective, especially once a large-scale insect infestation has started," Black said. Black noted that even logging dead trees could make things worse from an ecological standpoint, since their removal eliminates habitat for parasites and insect predators. Logging can also seriously damage soil and roots, leading to greater stress on remaining trees and increasing their susceptibility to outbreaks."

Gable, Eryn "Battling beetles may not reduce fore risks – report" Land Letter, March 4, 2010
http://www.xerces.org/2010/03/04/battling-beetles-may-not-reduce-fire-risks-report/

Insect Opposing Views #8 - "On the basis of this review, we conclude that:"

"The mountain pine beetle and other bark beetles are native species and natural and important agents of renewal and succession in interior forests. Beetle outbreaks create diversity in forest structure, tree ages and species composition at stand and landscape scales, which are important for forest ecosystem health, diversity, and productivity. Beetle-killed trees provide ecological services and functions well beyond their death. At the landscape scale, beetle infestations create a mosaic of forest patches of various ages, densities, species composition and successional stages."

"The current outbreak in central BC is a socio-economic challenge, rather than an ecological crisis. Mountain pine beetle outbreaks, like fire, are a natural disturbance to which interior forests are adapted and with which these forests have evolved for millennia."

"Management interventions have never before controlled a large outbreak."

"Sanitation and salvage clearcutting differ from natural disturbances in their effect on forest structure, and tend to reduce stand and landscape diversity. Natural disturbances vary in their intensity, frequency and magnitude, and amount and type of forest structure they retain. A large-scale clearcut is a stand replacement event that differs from a natural disturbance, especially in its intensity (percent of woody structures removed), frequency over time, and magnitude. Structural diversity at both the

stand and landscape level is important for maintaining biodiversity and for the ability of ecosystems to resist and recover from fires, diseases, and other disturbances. Reducing stand and landscape diversity through harvesting may increase the susceptibility of these forests to large mountain pine beetle outbreaks in the future."

"Current mountain pine beetle management fails to adequately ensure that ecological values are protected. The current legal framework allows 'emergency' exemptions from block-size requirements, terrain stability assessments, adjacency constraints and public review periods for operational plans. 'Emergency' logging may also occur in Old Growth Management Areas, Wildlife Habitat Areas, riparian reserves, Wildlife Tree Patches, Forest Ecosystem Networks, ungulate winter ranges, thus affecting the implementation of higher level planning, e.g., Land and Resource Management Plans."

Drever, Ronnie Ph.D. and Josie Hughes 2001 "Salvaging Solutions: Science-based management of BC's pine beetle outbreak" A report commissioned by the David Suzuki Foundation, Forest Watch of British Columbia (a project of the Sierra Legal Defence Fund), and Canadian Parks and Wilderness Society – B.C. Chapter
http://www.davidsuzuki.org/files/Pine_beetle.final_w=cover2.pdf

Insect Opposing Views #10 - "Scourge. Epidemic. Pest.

All are words often used to describe the pine beetles currently wreaking havoc across large tracts of North America's forests.

Yet nature is too complex for good-versus-evil characterizations, says Cameron Currie, an Edmonton-born scientist whose recent work has discovered a potential upside to the notorious bugs.

While the pine beetle's power to destroy has been well-documented, it may also have the power to heal. Currie's research discovered the insect is associated with a bacterium containing an antibiotic compound that could eventually lead to new life-saving medicines." (Pg. 9)

Gerein, Keith "Notorious pine beetle may be misunderstood" The Edmonton Journal, March 21, 2009
http://www.chetwyndecho.net/Issues/Issue_13_March_27_2009IWORK_-_website_PDF.pdf/

Insect Opposing Views #23 - "The sheer number of diverse opinions about how the mountain pine beetle epidemic will ultimately impact Wyoming's ecosystem suggests that there's no single strategy the state should employ in its forests at this time. There are simply too many unknowns, so scientists, conservationists and state officials are better off adopting a "wait and see" attitude than taking action now they might regret in the future."

"But it's clear that Wyoming would be best served if all parties view the beetle epidemic as a scientific issue and not a political one. Political solutions can be expedient, but in hindsight often prove to be costly mistakes."

"Some observers worry that the dead trees will create a significantly higher fire danger. Others suggest that the fire danger has been exaggerated. A study of lodgepole pines in the greater Yellowstone region, for example, concluded that beetles actually reduce the risk of wildfires by thinning tree crowns. Some experts note that wildfires are just as likely to erupt in green, healthy forests as they are in beetle-killed forests."

"But what should be done with the trees killed by beetles? Logging is one potential answer. The U.S. Forest Service, using a $40 million grant to clear beetle-killed trees, recently announced plans to cut about 14,000 acres of trees near communities and in more than 350 recreation sites in Wyoming and Colorado. Skeptical environmental groups, however, argue forestry officials are simply using the beetle epidemic as an excuse to do more logging on protected land."

"Wyoming can't afford to let those fears result in wasting millions of state and federal dollars fighting the epidemic and letting industry rush to chop down dead trees. Wyoming's best chance to make wise, informed decisions is to follow the science, and be willing to be nimble as data and test results change."

"Science should lead pine beetle epidemic solutions" Star-Tribune Editorial Board
Wyoming Star Tribune, October 3, 2010 http://trib.com/news/opinion/editorial/article_f87d7db9-ed2a-5620-8d66-20556935c592.html

*Response: The 2004 Sierra Nevada Forest Plan Amendment provides desired conditions for land allocations on the Eldorado NF. Goals for management include reducing threats to communities and wildlife habitat from large, severe wildfires, increasing stand sustainability by restoring a species composition and structure that is more resilient, and re-introducing fire into fire-adapted ecosystems. The Forest Plan decision includes managing hazardous fuels in and around communities combined with strategic placement of fuels treatments across broad landscapes to modify wildland fire behavior. The desired conditions for the project area and the need for treatment to move landscapes toward that condition were based upon direction in the Forest Plan.*

*The proposed project does not include salvage or sanitation clearcutting to reduce mountain pine beetle attack or to salvage the economic value of these trees in the wake of a beetle epidemic. An emergency exemption is not being used to analyze and document this project. This project is not a proposal to reduce the density of beetles in the forest. The purpose and need of this project relative to bark beetles is to increase the resilience of residual trees in treated stands. We agree that addressing the underlying causes of bark beetle epidemics is more effective than trying to control a beetle outbreak. This is not a proposal to salvage log areas to recover economic value from stands impacted by bark beetle.*

*Forest management requires continuous effort as trees and other vegetation grow and disturbances such as wildfire occur or are excluded from an area. Future fuels reduction maintenance treatments such as prescribed burning in thinned stands are proposed to maintain a reduction of ladder fuels for the foreseeable future, although future harvest in these areas is not precluded by this proposal. Currently stands are not in a desired condition that would make them resilient to drought, insect and disease, or wildfire. Some beetle induced mortality in the landscape is a desirable condition, however higher levels of*

*mortality across the landscape would jeopardize the multiple use management objectives of the forest and could threaten public safety. This is not a proposal to stem an ongoing epidemic, but rather to increase the resilience of these stands to all sorts of stresses.*

*Fire suppression is an ongoing management effort in this area, and is not within the scope of this proposal, however the combination of thinning and burning to reduce stand density and fuels at strategic locations on the landscape is expected to increase the resilience of residual trees within treated stand to insects based on increased resource availability to these trees over time. Short term increases in risk of mortality of large, residual pine to insect and disease attack is discussed in the Silviculture Report for the project and is summarized in Chapter 3. While bark beetle mortality is expected to continue to be a disturbance factor within the project landscape, treatments will reduce the potential for large portions of the landscape to support epidemic levels of bark beetles.*

*It is apparent, that a number of the comments pertaining to the role of insects, salvage of insect infested trees, efforts to stem insect epidemics, etc. provided by the commenter are clearly not directed at the Blacksmith project, but rather are likely to have been comments provided in the past on other National Forest salvage sale projects at a different time and place. More specifically, the opinion piece for what to do with dead trees in Wyoming is not relevant to the project nor is the comment concerning use of bacterium from pine beetles for medicine within the scope of this project decision.*

**DA-Attachment 5-D** Mortality does not increase fire severity and removal of dead trees does not lower fire severity

Insect Opposing Views #17 - "These results indicate that widespread removal of dead trees may not effectively reduce higher-severity fire in southern California's conifer forests. We found that sample locations dominated by the largest size class of trees (>61 cm diameter at breast height (dbh)) burned at lower severities than locations dominated by trees 28-60 cm dbh. This result suggests that harvesting larger-sized trees for fire-severity reduction purposes is likely to be ineffective and possibly counter-productive." (Pg. 1)

"We found that stands with recent high pre-fire tree mortality due to drought and insects did not burn at higher severity in coniferous forests of the San Bernardino Mountains, southern California, in the two fires we examined. Pollet and Omi [32] reported anecdotally that stands of lodgepole pine (P. contorta) that experienced an insect epidemic in the 1940s in Yellowstone National Park burned at lower severities compared to adjacent burned areas in the 1994 Robinson Fire. A widespread low-severity fire in subalpine forests in the White River National Forest, Colorado did not burn any beetle-affected stands [13]. Further, Bebi et al. [12] found that stands of Engelmann spruce (Picea engelmannii) and subalpine fir (A. lasiocarpa) in the White River National Forest influenced by a spruce beetle outbreak in the 1940s did not show higher susceptibility to 303 subsequent forest fires that burned after 1950." (Pgs. 45 and 46)

Bond, Monica L., Derek E. Lee, Curtis M. Bradley and Chad T. Hanson Ph.D. "Influence of Pre-Fire Tree Mortality on Fire Severity in Conifer Forests of the San Bernardino Mountains, California" The

Open Forest Science Journal, 2009, 2, 41-47
http://www.biologicaldiversity.org/publications/papers/Bond_et_al.pdf

Insect Opposing Views #18 - "A new study in the lodgepole pine forests of the greater Yellowstone region concludes that rather than increasing the wildfire risk, beetle attacks reduce it by thinning tree crowns."

"The researchers used satellite imagery to map lodgepole stands attacked by mountain pine beetles, a type of bark beetle, then hiked into the areas to confirm the beetle damage and measure fuel loads. Then they ran computer models to predict fire behavior."

Boxall, Bettina "Bark beetles may kill trees, but that may not raise fire risk"
Los Angeles Times, September 26, 2010 http://articles.latimes.com/2010/sep/26/nation/la-na-beetle-fire-20100926

Insect Opposing Views #19 - "The primary driver of fire is not beetle kill. It's climate," said Barry Noon, a wildlife ecology professor at Colorado State University and an author of the report. "It's drought and temperature."

The report warns against using tax dollars to fund widespread forest-thinning efforts, particularly in roadless areas that have been off-limits to logging.

Instead, the authors encourage efforts to be focused around the edges of communities.

"We're certainly not arguing against cutting down some of these trees, but we think that the cutting effort needs to be focused around communities and homes," Noon said. "It makes little sense to have wide-scale cutting of these trees." "

Frey, David "Logging Won't Halt Beetles, Fire, Report Says" NewWest Travel and Outdoors, 3/03/10 http://www.newwest.net/topic/article/logging_wont_halt_beetles_fire_report_says/C41/L41/

Insect Opposing Views #21 - "Although ongoing outbreaks understandably have led to widespread public concern about increased fire risk, the best available science indicates that outbreaks of mountain pine beetle and spruce beetle do not lead to an increased risk of fire in the vast majority of forests that are currently being affected. We should not let the effects of bark beetle outbreaks, as spectacular as they may be, distract us from the real risk. The real concern in that we have built homes, communities, ski resorts, and other infrastructure in inherently flammable ecosystems. The ongoing outbreaks have not increased the risk of wildfire as much as they have drawn attention to the risk that has been there long before the outbreaks began. Forests of lodgepole pine and spruce-fir are prone to high-severity fires during drought conditions, regardless of the influence of bark beetle outbreaks." (Pg. 5)

Kulakowski, Dominik Ph.D. Assistant Professor, Clark University Testimony before the Subcommittee on Public Lands and Forests of the Energy and Natural Resources

Committee of the United States Senate April 21, 2010
http://energy.senate.gov/public/_files/KulakowskitestimonyonS2798042110.pdf

Insect Opposing Views #24 - "The idea that beetle damaged trees increase fire risks seems a logical assumption – dead trees appear dry and flammable, whereas green foliage looks more moist and less likely to catch fire. But do pine beetles really increase the risk of fire in lodgepole pine forest? University of Wisconsin forest ecologists Monica Turner and Phil Townsend, in collaboration with Renkin, are studying the connection in the forests near Yellowstone National Park. Their work -- and their surprising preliminary results -- are the subject of the NASA video."

Link to the video: http://svs.gsfc.nasa.gov/vis/a010000/a010600/a010634/G2009-098_Wildfire_and_Beetles__ipod_lg.m4v

"Their preliminary analysis indicates that large fires do not appear to occur more often or with greater severity in forest tracts with beetle damage. In fact, in some cases, beetle-killed forest swaths may actually be less likely to burn. What they're discovering is in line with previous research on the subject."

"The results may seem at first counterintuitive, but make sense when considered more carefully. First, while green needles on trees appear to be more lush and harder to burn, they contain high levels very flammable volatile oils. When the needles die, those flammable oils begin to break down. As a result, depending on the weather conditions, dead needles may not be more likely to catch and sustain a fire than live needles."

"Second, when beetles kill a lodgepole pine tree, the needles begin to fall off and decompose on the forest floor relatively quickly. In a sense, the beetles are thinning the forest, and the naked trees left behind are essentially akin to large fire logs. However, just as you can't start a fire in a fireplace with just large logs and no kindling, wildfires are less likely to ignite and carry in a forest of dead tree trunks and low needle litter. "

Shoemaker, Jennifer, NASA Goddard Space Flight Center "Landsat Reveal Surprising Connection Between Beetle Attacks, Wildfire" Posted at the NASA WEB site, Sep. 8, 2010
http://landsat.gsfc.nasa.gov/news/news-archive/sci_0031.html

Insect Opposing Views #25 - "MANAGEMENT IMPLICATIONS
(1) Our findings suggest that mountain pine beetle infestation in lodgepole pine does not increase the subsequent risk of active crown fire, and that fire does not necessarily cause an epidemic of mountain pine beetle in nearby lodgepole pine." (Pg. 37)

"(3) Even within high-severity bark beetle infestations, all lodgepole pine trees were not killed. These forests generally remain well stocked, with density of young trees sufficient to replace individuals lost during the current epidemic." (Pg. 38)

"(5) Our findings support the need for forest managers to take a long-term and broad-scale view of timber and disturbance dynamics." (Pg. 38)

"(6) Because climate drivers are so important for both fire and insect disturbances, forest managers may be very limited in their ability to change or stop these disturbances." (Pg. 39)

Tinker, Daniel B. Ph.D. et al., 2010 "Reciprocal interactions between bark beetles and wildfire in subalpine forests: landscape patterns and the risk of high-severity fire" A research paper sponsored in part by the Joint Fire Science Program
http://landscape.zoology.wisc.edu/October%202009%20updates/JFSP_FnlRep_30Sept2009.pdf

Insect Opposing Views #26 - "The current pine beetle "outbreak" that has led to tree mortality among Rocky Mountain forests has prompted some people to suggest that beetles are "destroying" our forests and that beetle-killed trees will invariably lead to larger wildfires.

At the heart of this issue are flawed assumptions about wildfires, what constitutes a healthy forest and the options available to humans in face of natural processes that are inconvenient and get in the way of our designs.

While it may seem intuitive that dead trees will lead to more fires, there is little scientific evidence to support the contention that beetle-killed trees substantially increase risk of large blazes. In fact, there is evidence to suggest otherwise."

Wuerthner, George Pine Beetle Fears Misplaced Helena Independent Record, March 25, 2010
http://helenair.com/news/opinion/article_f3d671f0-37c9-11df-921d-001cc4c002e0.html

***Response:*** *The citations presented by the commenter provide general information on insect attack in the Interior Mountain region characterized by vegetation types that are quite different from those in the Sierra Nevada. Specific information in the Sierra Nevada indicates an increase in mortality of mixed conifer species especially ponderosa pine, sugar pine and Jeffrey pine. This increase (Bouldin 1999, van Mantgem and Stephenson 2007, Lutz et al. 2009) appears to be linked to fire suppression (Bouldin 1999, Lutz et al. 2009) and climate change (van Mantgem and Stephenson 2007, van Mantgem 2009). Fire suppression has led to a high density of trees causing moisture stress and consequently more beetle activity (Fettig 2007). Other insects and pathogens have also capitalized on the more even aged dense forest structure. In a natural mixed severity fire regime, interactions with the more heterogeneous landscape with lower stand densities would have reduced the incidence of beetle attack. In fact, beetles have replaced fire as a principle agent of mortality. A comparison to reference sites (San Pedro Martir, Baja CA) showed that in areas with a lower stand density trees were not moisture stressed and mortality was substantially reduced (Savage 1997, Stephens and Gill 2005). Future climate predictions support increased moisture stress to trees and increased bark beetle populations due to a milder climate could potentially increase mortality.*

*The Proposed Action does not propose to remove snags unless they pose a hazard to workers. While small isolated areas of dead trees may not affect fire intensity and severity, a large scale mortality event*

*would potentially affect fire behavior causing problem and/or extreme fire behavior conditions. As a tree dies, it loses foliar moisture content and subsequently the needles become available at lower burning conditions to burn promoting the potential for crown fire initiation. There are several stages of decay of concern for fire behavior. In the red (needle) phase, probability the potential for torching and active crown fire increases while surface fuels remain unchanged because the needles and small branch wood have yet to fall off the tree to increase surface fuel loading. In the gray and old phases, surface fire probability increases following increased surface fuel loads. Crown fire probability in these phases may decrease because of reduced canopy bulk density but may increase as a result of increased torching potential (Hicke et al. 2012).*

*Klutsch et. al.(2011) found "Mountain pine beetle-induced changes in stand and fuel characteristics were reflected in all three measures of fire behavior involving surface fuels. Surface flame length, surface rate of spread, and reaction intensity were lower in uninfested plots compared with plots 7 years after outbreak…" As trees continue to die and decay, branch wood is an additional fuel that becomes available to burn compared to a green tree. Overtime, as trees decay overall surface burn severity would increase due to the increased surface fuel loads and greater reaction intensity (Hicke, et al. 2012).*

**Opposing Views Attachment #9a and 18. Toxicity Determinations for Herbicides Containing Glyphosate that are based on Recent Scientific Research and Following Label Directions on "Approved" Herbicides Containers does not Assure Safety**

**DA-Attachment 9a A** Citations specific to Roundup

Glyphosate safety opposing view #1 and #44 - "Chronic Effects of Glyphosate versus Formulations: Throughout this study glyphosate itself showed no chronic effects on developing tadpoles. The tadpoles reared in the formulations Roundup Original® and Transorb® did show significant physical abnormalities. Abnormalities were also found upon exposure to the surfactant POEA. For all endpoints POEA showed practically identical results to the Roundup Original® formulation whereas the same cannot be said for the Transorb® formulation. The surfactant used in the Transorb formulation is not known (being protected as "Trade Secret"), but has been described as a "surfactant blend". This "surfactant blend" may be responsible for inhibition of metamorphosis, as well as the skewed sex ratio towards female seen in the present study.

Developmental abnormalities induced by Roundup are likely a result of endocrine disruption. The thyroid axis can be greatly affected by corticoids and sex steroids which influence hypothalamic and pituitary control (See Dodd and Dodd, 1976, and Hayes, 1997 for review). Corticoids, sex steroids and prolactin have caused delayed metamorphosis and decreased size by both antagonizing and inhibiting thyroid action (Hayes, 1997). Sex steroid can induced sex reversal and intersex in amphibians and mammals, while low thyroid levels interfere with vitellogenesis. A concentration at which the animals were not affected (NOEC) by The Roundup formulations was not determined by this study.

Howe, Christina Ph.D., Michael Berrill Ph.D., and Bruce D. Pauli 2001 "The Acute and Chronic Toxicity of Glyphosate-Based Pesticides in Northern Leopard Frogs" http://www.trentu.ca/biology/berrill/Research/Roundup_Poster.htm and Amphibian Ecology and Pathobiology, August 14, 2002 http://www.trentu.ca/biology/berrill/Research/Roundup_Poster.htm

Glyphosate safety opposing view #9 - "Glyphosate (N-(phosphonomethyl) glycine, C3H8NO5P), a herbicide, used to control unwanted annual and perennial plants all over the world. Nevertheless, occupational and environmental exposure to pesticides can pose a threat to nontarget species including human beings. Therefore, in the present study, genotoxic effects of the herbicide glyphosate were analyzed by measuring chromosomal aberrations (CAs) and micronuclei (MN) in bone marrow cells of Swiss albino mice. A single dose of glyphosate was given intraperitoneally (i.p) to the animals at a concentration of 25 and 50 mg/kg b.wt. Animals of positive control group were injected i.p. benzo(a)pyrene (100 mg/kg b.wt., once only), whereas, animals of control (vehicle) group were injected i.p. dimethyl sulfoxide (0.2 mL). Animals from all the groups were sacrificed at sampling times of 24, 48, and 72 hours and their bone marrow was analyzed for cytogenetic and chromosomal damage. Glyphosate treatment significantly increases CAs and MN induction at both treatments and time compared with the vehicle control (P<.05). The cytotoxic effects of glyphosate were also evident, as observed by significant decrease in mitotic index (MI). The present results indicate that glyphosate is clastogenic and cytotoxic to mouse bone marrow."

Prasad, Sahdeo, Ph.D., Smita Srivastava Ph.D., Madhulika Singh Ph.D., and Yogeshwer Shukla Ph.D. "Clastogenic Effects of Glyphosate in Bone Marrow Cells of Swiss Albino Mice" Journal of Toxicology Volume 2009 (2009), Article ID 308985, 6 pages
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2809416/

Glyphosate safety opposing view #10 - "PITTSBURGH--The herbicide Roundup® is widely used to eradicate weeds. But a study published today by a University of Pittsburgh researcher finds that the chemical may be eradicating much more than that.

Pitt assistant professor of biology Rick Relyea found that Roundup®, the second most commonly applied herbicide in the United States, is "extremely lethal" to amphibians. This field experiment is one of the most extensive studies on the effects of pesticides on nontarget organisms in a natural setting, and the results may provide a key link to global amphibian declines.

In a paper titled "The Impact of Insecticides and Herbicides on the Biodiversity and Productivity of Aquatic Communities," published in the journal Ecological Applications, Relyea examined how a pond's entire community--25 species, including crustaceans, insects, snails, and tadpoles--responded to the addition of the manufacturers' recommended doses of two insecticides--Sevin® (carbaryl) and malathion--and two herbicides--Roundup® (glyphosate) and 2,4-D.

Relyea found that Roundup® caused a 70 percent decline in amphibian biodiversity and an 86 percent decline in the total mass of tadpoles. Leopard frog tadpoles and gray tree frog tadpoles were completely eliminated and wood frog tadpoles and toad tadpoles were nearly eliminated. One species of frog, spring peepers, was unaffected."

Reeves, Walter. "Roundup®highly lethal to amphibians, finds University of Pittsburgh researcher" The Georgia Gardener, 2009
http://www.walterreeves.com/tools_chemicals/article.phtml?cat=22&id=889

Glyphosate safety opposing view #11 - "For all nine species of larval anurans, the Kruskal-Wallis analyses detected significant effects of pesticide concentration on mortality (p # 0.002; Fig. 1). The subsequent mean comparisons, using Dunnett's tests, indicated the lowest concentrations that caused significantly greater mortality than the control (p , 0.05). For two species (bullfrogs and spring peepers), 1 mg a.e./L of glyphosate caused significantly greater mortality than the control. For the remaining seven species (green frogs, leopard frogs, wood frogs, Cascades frogs, American toads, western toads, and gray tree frogs), 2 mg a.e./L of glyphosate was the lowest concentration to cause

significantly greater mortality than the control. Based on the probit analyses, the estimated LC5096-h values for the nine species of larval anurans ranged from 0.8 to 2.0 mg a.e./L (Table 2)."

Relyea, Rick A. Ph.D. and Devin K. Jones "The Toxicity of Roundup Original Max to 13 Species of Larval Amphibians" Environmental Toxicology and Chemistry, Vol. 28, No. 9, pp. 2004–2008, 2009 http://www.pitt.edu/news2009/Roundup.pdf

Glyphosate safety opposing view #12 - "A recent study of Roundup presents new evidence that the glyphosate-based herbicide is far more toxic than the active ingredient alone. The study, published in the June 2005 issue of Environmental Health Perspectives, reports glyphosate toxicity to human placental cells within hours of exposure, at levels ten times lower than those found in agricultural use. The researchers also tested glyphosate and Roundup at lower concentrations for effects on sexual hormones, reporting effects at very low levels. This suggests that dilution with other ingredients in Roundup may, in fact, facilitate glyphosate's hormonal impacts."

"The evidence presented in the recent study is supported by earlier laboratory studies connecting glyphosate with reproductive harm, including damaged DNA in mice and abnormal chromosomes in human blood. Evidence from epidemiological studies has also linked exposure to the herbicide with increased risk of non-Hodgkin's lymphoma, and laboratory studies have now begun to hone in on the mechanism by which the chemical acts on cell division to cause cancer. A Canadian study has linked glyphosate exposure in the three months before conception with increased risk for miscarriage and a 2002 study in Minnesota connected glyphosate exposure in farm families with increased incidence of attention deficit disorder."

"Rethinking Roundup" Pesticide Action Network North America (PANNA) Update, August 5, 2005 http://www.panna.org/node/466

Glyphosate safety opposing view #15 - "This review suggests that the silvicultural use of glyphosate needs to be re-evaluated with respect to non-target impacts on amphibians in B.C. In addition, knowledge gaps hinder effective and realistic assessment of these impacts. Glyphosate impacts can be species-specific in amphibians, but acute toxicity values are known for only two native B.C. amphibians (the Wood Frog, Rana sylvatica, and the Leopard Frog, R. pipiens). The impact of glyphosate herbicides on salamander species and on terrestrial stages of amphibians is not well understood. There is insufficient information on the levels of glyphosate contamination in small ephemeral wetlands, which are favoured habitats of amphibians, and which may be exposed to direct overspraying with herbicide under current use guidelines. Although the surfactant in glyphosate herbicides, POEA, has been identified as potentially the primary ingredient causing toxicity to amphibians, the option of using surfactants of lower toxicity has not been assessed. These knowledge gaps need to be addressed so that best management practices can be developed to minimize non-target impacts on amphibians from the use of glyphosate herbicides in forestry." (Pg. iii)

Govindarajulu, Purnima P. Ph.D. "Literature review of impacts of glyphosate herbicide on amphibians: What risks can the silvicultural use of this herbicide pose for amphibians in B.C.?" British Columbia Ministry of Environment, Wildlife Report No. R-28, June 2008 http://www.llbc.leg.bc.ca/public/pubdocs/bcdocs/442206/finishdownloaddocument.pdf

Glyphosate safety opposing view #19 - "A recently published study by Italian researchers [3] examined the toxicity of four popular glyphosate based herbicide formulations on human placental cells, kidney cells, embryonic cells and neonate umbilical cord cells and surprisingly found total cell death of each of these cells within 24 hours. The researchers reported several mechanisms by which the herbicides caused the cells to die including: cell membrane rupture and damage, mitochondrial

damage and cell asphyxia. Following these findings, the researchers tested G, AMPA and POEA by themselves and concluded that, 'It is very clear that if G, POEA, or AMPA has a small toxic effect on embryonic cells alone at low levels, the combination of two of them at the same final concentration is significantly 'deleterious'.

Although previous researchers have proposed that the supposed 'inert ingredients' alter the role of cell membrane disruptors in fish, amphibians, microorganisms [4] and plants [5], independent of G, this study is the first of its kind to report similar findings in human cells. The researchers concluded that, "the proprietary mixtures available on the market could cause cell damage and even death around residual levels to be expected, especially in food and feed derived from R [Roundup] formulation-treated crops" which are pervasive in GM-soya."

"Toxicity of Glyphosate" Natural Communities magazine, July 16th, 2009
http://naturalcommunitiesmag.com/2009/07/16/gm-soy-destroy-the-earth-and-humans-for-profit/

Glyphosate safety opposing view #34 - "In contrast to malathion, Roundup had strong direct effects on the tadpoles. Roundup caused a 40% reduction in total tadpole survival and biomass. The impact of Roundup (with POEA [polyethoxylated tallow-amine] surfactant) is consistent with previous laboratory studies in a variety of species. Mann and Bidwell (1999) estimated LC5048h at 3.9 to 15.5 mg active ingredient (AI)/L in four species of Australian tadpoles while Perkins et al. (2000) estimated LC5096h values of 12.4 mg AI/L in the African clawed frog (Xenopus laevis). In both studies, it was clear that the high toxicity of Roundup was caused by the POEA surfactant and not from the active ingredient (glyphosate). Lajmanovich et al. (2003) examined the impact of Kleeraway (another formulation of glyphosate that contains the POEA surfactant) on a South American tadpole (Scinax nasicus) and found an LC5048h of 1.74 mg AI/L. In North American tadpoles (Bufo americanus, Rana pipiens, and R. clamitans), Edginton et al. (2004) found LC5096h of 1.5–4.7 mg AI/l using Vision (a formulation that also includes the POEA surfactant). For the three species used in our mesocosm experiment, Relyea (2005b) found LC5016d values of 1.4 mg AI/L for gray tree frogs, 2.5 mg AI/L for American toads, and 2.5 mg AI/L for leopard frogs. All of this suggests that Roundup with the POEA surfactant can cause substantial mortality in larval amphibians."

Relya, Rick A. Ph.D., Nancy Schoeppner and Jason T. Hoverman, "Pesticides and Amphibians: The Importance of Community Context" Ecological Applications, 15(4), July 1, 2005, pp. 1125–1134
http://www.mindfully.org/Pesticide/2005/Roundup-Amphibians-Community1jul05.htm

Glyphosate safety opposing view #45 - "Concern #1: Roundup is only intended for terrestrial use, not aquatic use
While it may be intended for terrestrial use, there is overwhelming evidence that Roundup gets into aquatic habitats, typically through inadvertent (or unavoidable) aerial overspray (Newton et al. 1984, Goldsborough and Brown 1989, Feng et al. 1990, Thompson et al. 2004). To determine the effect on amphibians, Relyea (2005a) simulated a direct overspray of a small wetland using pond mesocosms (1000-liter tanks). The result was widespread death for many species and the death rate was much higher than expected based on previous studies of Roundup. It is relatively common knowledge that Roundup should not be applied to large ponds and lakes, but it seems to be much less commonly appreciated that many amphibians are not produced in large ponds and lakes due to predation by fish. Instead, small temporary wetlands that may appear to be unimportant and only have 6" of water can, in fact, produce thousands of tadpoles. These small, temporary pools are either not avoided or not avoidable by aerial pesticide applications.

Moreover, Roundup is not only lethal to amphibian larvae. New studies have found that Roundup can be highly lethal to terrestrial amphibians as well (Relyea 2005c)."

"Concern #2: The application rate of Roundup was 7 times too high
The application rate of 6 ounces per 300 square feet came directly from the label of Monsanto's "Roundup Weed and Grass Killer". What Monsanto is claiming is that the application rate for this Roundup is higher than their listed application rate for other forms of Roundup. However, both application rates come from Monsanto. Moreover, it is well accepted by Monsanto and the applicators of Roundup that some types of weeds require up to four times the recommended application rate to be effective."

"Concern #4: A past risk assessment has shown that Roundup poses minimal risk to amphibians
The risk assessment was conducted by Giesy et al. (2000), in cooperation with Monsanto, and the assessment was based on the available data at that time. For amphibians, data only existed for four species of Australian tadpoles and one species of African frog. From these studies, the LC50 estimates (the amount of pesticide needed to kill 50% of the animals) were 4 to 16 mg a.i./L (Mann and Bidwell 1999, Perkins et al. 2000).

More recent LC50 laboratory data for North American amphibians demonstrate that North American amphibians are much more sensitive; LC50 values range from 0.5 to 4.7 mg a.i./L (Edginton et al. 2004, Relyea 2005b). According to U.S. Fish and Wildlife classifications, this means that Roundup can no longer be considered slightly to moderately toxic, but rather moderately to highly toxic to North American amphibians."

Relya, Rick Ph.D. "Roundup is Highly Lethal" Dr. Relya Responds to Monsanto's Concerns Regarding Recent Published Study Mindfully.org, April 1, 2005
http://www.mindfully.org/GE/2005/Relyea-Monsanto-Roundup1apr05.htm

Glyphosate safety opposing view #59 - "In one study, for instance, we exposed neural stage embryos and newly hatched tadpoles of green frogs to low levels of the herbicide glyphosate. Following 96 hours of exposure to the herbicide, surviving animals were moved to fresh water. Nominal glyphosate concentrations of 1.2 to 4.0 ppm initially caused tadpoles paralysis from which they eventually recovered. During the first 24 hours of exposure to 8.0 ppm, all tadpoles either died or were completely paralysed. Furthermore, almost all of the survivors from the first 24 hours of exposure died before the completion of the 96-hour exposure period. Follow-up tests indicated that much of the toxicity could be attributed to the surfactant used in the RoundUp® formulation of glyphosate."

Pauli, Bruce and M. Berrill Ph.D. "Pesticides and Behaviour in Tadpoles" In Environmental Contaminants and Amphibians in Canada http://www.open.ac.uk/daptf/froglog/FROGLOG-16-5.html

Herbicide Safety Testing Opposing View #96 – "Asked about the harmlessness of Roundup, Lovera replies, "That's the PR behind Roundup – how benign it was and you can drink it and there's nothing to worry about here. There are people who dispute that." For example there is an accusation that Roundup causes birth defects. "We don't buy the benign theory," continues Lovera, "But what's really interesting is that we aren't going to be having this conversation pretty soon because Roundup isn't working anymore."

Jill Richardson, "Monsanto controls our food, poisons our land, and influences all three branches of government." Alternet, April 18, 2013

Source: http://www.alternet.org/food/how-monsanto-went-selling-aspirin-controlling-our-food-supply?paging=off

***Response:*** *These citations are not relevant to the proposed project. All of the above citations are specific to effects of Roundup, which contains glyphosate and a surfactant. Specifically most of the studies use a formulation of Roundup that contains a POEA surfactant. The toxic formulations of glyphosate involve the more commercially available Roundup which contains the polyoxyethyleneamine (POEA) surfactant, which will not be used in the Blacksmith project. The toxicity of the original Roundup and similar formulations containing POEA surfactants is far greater than the toxicity of technical grade glyphosate. As stated in the one citation "Throughout this study glyphosate itself showed no chronic effects on developing tadpole". Neither Roundup Original® nor Transorb® is proposed for use with this project.*

*Glyphosate, adjuvants, and colorants are all analyzed in the Specialist Reports for the project. Glyphosate is the only substance in the SERA Risk Assessments to have a defined 'Hazard Quotient" rating. These hazard quotients can be found in the applicable reports. For the more toxic formulations of glyphosate (i.e., formulations with POEA), the risk characterization for aquatic organisms suggests that amphibians are the group at greatest risk in both terms of sensitivity and severity of effects.*

**DA-Attachment 9a B** Glyphosate can persist in the soil, can damage habitat, and is lethal to wildlife including amphibians, wildlife, fish, and beneficial insects in addition to humans.

Glyphosate safety opposing view #2 - "After spraying, glyphosate herbicides can remain in soils for long periods. The herbicide can drift onto neighbouring fields, streams or hedges. Roundup kills beneficial insects. It wipes out habitat for birds and animals. Glyphosate causes genetic damage to fish. It is "extremely lethal to amphibians", according to assistant professor of biology Rick Relyea at the University of Pittsburgh. It is hazardous to earthworms. Glyphosate reduces nitrogen fixation. Roundup reduces the growth of mycorrhizal fungi. Roundup can increase the spread and severity of plant diseases (see WRM Bulletin no. 18)."

"Glyphosate herbicides can have a range of impacts on human health, including genetic damage, skin tumours, thyroid damage, anaemia, headaches, nose bleeds, dizziness, tiredness, nausea, eye and skin irritation, asthma and breathing difficulties. Several studies have indicated a link between glyphosate herbicides and non-Hodgkin's lymphoma, a type of cancer."

Lang, Chris "Glyphosate herbicide, the poison from the skies". WRM's bulletin Nº 97, August 2005 http://www.wrm.org.uy/bulletin/97/Glyphosate.html

Glyphosate safety opposing view #16 - "E. Wider ecological concerns of the genetically engineered soya beans

1. Glyphosate is a broad-spectrum herbicide which will have major impacts on biodiversity (see Greenpeace Report, 1998, and references therein). It kills all plants indiscriminately. This will destroy wild plants as well as insects, birds, mammals and other animals that depend on the plants for food and shelter. In addition, Roundup (Monsanto's formulation of glyphosate) can be highly toxic to fish. Glyphosate also harms earthworms and many beneficial mycorrhizal fungi and other microorganisms that are involved in nutrient recycling in the soil. It is so generally toxic that researchers are even investigating its potential as an antimicrobial (Roberts et al, 1998)."

Affidavit submitted by Mae-Wan Ho Ph.D. , August 12, 1998 http://www.i-sis.org.uk/greenpeace.php?printing=yes

Glyphosate safety opposing view #26 - "Terrestrial toxicity:
A number of species of birds, mammals and beneficial insects suffer population loses through habitat and/or food supply destruction resulting from the use of glyphosate. There are also direct lethal and sublethal effects.

- Birds LD50 (mg/kg body weight) >3851
- Beneficial Insects oral LD50 >100ug/bee. (Cox 1995b; IPCS 1994)

Exposure to freshly applied Roundup killed more than half of three species - a parasitoid wasp, a lacewing, and a ladybug - and more than 80 percent of a predatory beetle. Carabid beetle populations have shown significant decline and slow recovery after glyphosate application (Asterarki et al., 1992; Brust, 1990; Hassan 1988)

Glyphosate adversely affects a number of soil and plant fauna, such as the beneficial predatory mites. However, it prolonged larval survival of the foliar-feeding nematode Nothanguinea by 50% thus increasing the damage done by this pest. (Carlisle & Trevore, 1987; Eijsackers 1985)

Glyphosate may inhibit a number of fungi that decompose dead plant material. Roundup applied to the soil in repeated doses had a substantial adverse effect on the growth rate of earthworms. The reproductive capacity and the total population in the soil could be expected to fall following repeated low doses of biocides. IPCS, however, classifies glyphosate as having low toxicity to earthworms with a No Observed Effects Concentration of 158mg/kg. (Grossbard 1985; IPCS, 1994; Springett and Gray, 1992)

Laboratory studies show significant effects on nitrogen fixation, denitrification and nitrification. (IPCS 1994)

Watts, Meriel and Ronald Macfarlane, "Glyphosate" A Pesticide Action Network - Asia and the Pacific publication, 1999 http://www.poptel.org.uk/panap/pest/pe-gly.htm

Glyphosate safety opposing view #27 - Regarding your article, Mystery of Disappearing Honeybees (SiS 34), I am a Dutch beekeeper in the east of the Netherlands near Germany, and we see the same problem with bees, as in Belgium, Germany, France and the whole of Europe. In the Netherlands the government is set to give permission for growing GMOs, even in such a very small country. It will cause a lot of damage: bad for biodiversity, the earth, water, air, drinking water and food.

I just lost 68 percent of my bees, and I blame the city workers who sprayed glyphosate twice at the end of October last year. My beehives were 4 metres from the spray, whereas the legal distance is 200 metres. By the beginning of January 2008, the bees started to die. The municipal authorities in villages and small cities spray glyphosate on weeds in public places, gardens and footpaths. In big cities, they would use steam instead of weed killers.

I did a 'test' in September 2007 with a bit of glyphosate, and within three or five minutes, the bees were dead. It is very important for the city workers to give people warning when they spray, but they never do.

We must study the toxic effects of GMOs and glyphosate, for the sake of the next generation, our children, as well as the sick and old people.

Broek, Hans van den, "Glyphosate kills bees" The Institute of Science in Society
Science in Society #38, summer 2008 http://www.i-sis.org.uk/SIS38lettersToTheEditor.php

Glyphosate safety opposing view #33 - "There is, indeed, direct evidence that glyphosate inhibits RNA transcription in animals at a concentration well below the level that is recommended for commercial spray application. Transcription was inhibited and embryonic development delayed in sea urchins following exposure to low levels of the herbicide and/or the surfactant polyoxyethyleneamine. The pesticide should be considered a health concern by inhalation during spraying [4]."

"New research shows that a brief exposure to commercial glyphosate caused liver damage in rats, as indicated by the leakage of intracellular liver enzymes. In this study, glyphosate and its surfactant in Roundup were also found to act in synergy to increase damage to the liver [5]."

Ho, Mae-Wan Ph.D. and Prof. Joe Cummins Ph.D. "Glyphosate Toxic & Roundup Worse" An Institute of Science in Society publication, 07/03/05 http://www.i-sis.org.uk/GTARW.php

Glyphosate safety opposing view #34 - "The decline in amphibians across the globe has sparked a search for the causes, and recent evidence suggests a connection with pesticides. However, for most pesticides, tests on amphibians are rare and conducted only for short durations (1 to 4 days) and without natural stressors. Recent studies have discovered that the stress of predator cues in the water can make insecticides much more lethal to larval amphibians, but it is unknown whether this phenomenon can be generalized to other types of pesticides. Using six species of North American amphibian larvae (Rana sylvatica, R. pipiens, R. clamitans, R. catesbeiana, Bufo americanus, and Hyla versicolor), I examined the impact of a globally common herbicide (Roundup) on the survival of tadpoles for 16 days with and without the chemical cues emitted by predatory newts (Notophthalmus viridescens). LC5016-d estimates varied from 0.55 to 2.52 mg of active ingredient (AI)/L, which was considerably lower than the few previous studies using Roundup (1.5 to 15.5 mg AI/L). Moreover, in one of the six species tested (R. sylvatica), the addition of predatory stress made Roundup twice as lethal. This discovery suggests that synergistic interactions between predatory stress and pesticides may indeed be a generalizable phenomenon in amphibians that occurs with a wide variety of pesticides."

Relyea, R.A. Ph.D. "The Lethal Impacts of Roundup and Predatory Stress on Six Species of North American Tadpoles" Archives of Environmental Contamination and Toxicology v 48, n. 3, April 1, 2005 http://www.mindfully.org/Pesticide/2005/Roundup-Tadpoles-Relyea1apr05.htm

Glyphosate safety opposing view #35 - "Species richness was reduced by 15% with Sevin, 30% with malathion, and 22% with Roundup, whereas 2,4-D had no effect. Both insecticides reduced zooplankton diversity by eliminating cladocerans but not copepods (the latter increased in abundance). The insecticides also reduced the diversity and biomass of predatory insects and had an apparent indirect positive effect on several species of tadpoles, but had no effect on snails. The two herbicides had no effects on zooplankton, insect predators, or snails. Moreover, the herbicide 2,4-D had no effect on tadpoles. However, Roundup completely eliminated two species of tadpoles and nearly exterminated a third species, resulting in a 70% decline in the species richness of tadpoles. This study represents one of the most extensive experimental investigations of pesticide effects on aquatic communities and offers a comprehensive perspective on the impacts of pesticides when nontarget organisms are examined under ecologically relevant conditions."

Relyea, R.A. Ph.D. "The Impact of Insecticides and Herbicides on the Biodiversity and Productivity of Aquatic Communities" Ecological Applications v 15, n. 2, April 1, 2005 http://www.mindfully.org/Pesticide/2005/Roundup-Aquatic-Communities1apr05.htm

Glyphosate safety opposing view #36 - “He is joined in his conclusions by Robert Bellé, from the National Center for Scientific Research (CNRS) biological station in Roscoff (Finistere), whose team has been studying the impact of glyphosate formulations on sea-urchin cells for several years. This recognized model for the study of early stages of cancer genesis earned Tim Hunt the 2001 Nobel Prize in medicine. In 2002, the Finisterian team had shown that Roundup acted on one of the key stages of cellular division.

The Breton team has recently demonstrated (Toxicological Science, December 2004) that a "control point" for DNA damage was affected by Roundup, while glyphosate alone had no effect. "We have shown that it's a definite risk factor, but we have not evaluated the number of cancers potentially induced, nor the time frame within which they would declare themselves," the researcher acknowledges. A sprayed droplet could affect thousands of cells. On the other hand, "the concentration in water and fruits is lower, which is rather reassuring."

Morin, Herve “Roundup Doesn’t Poison Only Weeds” Le Monde (France) March 12, 2005
http://www.mindfully.org/GE/2005/Roundup-Poison12mar05.htm

Glyphosate safety opposing view #43 - “5. SUMMARY OF GLYPHOSATE IMPACTS ON AMPHIBIANS
This summary is derived almost entirely from toxicological studies on tadpoles and late-stage anuran embryos. The impact of glyphosate herbicides on other amphibians and other life stages is virtually unknown.

- Recent studies have shown that tadpoles are one of the vertebrate groups most sensitive to the toxicity effects of most commercial formulations of glyphosate herbicides, including Vision.

- The estimated LC50 values for some species of amphibians are at or below the expected environmental concentration (EEC) of 1.43 mg a.e./L of Vision (Table 1). Most LC50 values are calculated from experimental durations of 24 to 96 hours, but at low concentrations death may not occur until after 96 hours. This suggests that amphibians may be even more sensitive than the published LC50 values suggest.

- Although LC50 values have traditionally been used to set hazard quotients, recent risk analysis methodology suggests that LC10 values are better for judging population-level impacts of environmental contaminants (Solomon and Thompson 2003). In at least one published study, all North American amphibian larvae tested to date had LC10 values estimated at or below the EEC for Vision, especially at pH higher than 7.0.

- In addition to direct mortality effects, glyphosate herbicides also cause sublethal effects, including reduced growth and development rates, behavioural impairment, and genomic effects. The population-level consequences of these sublethal effects have not been tested under field conditions. For example, reduced growth and development rates, which have been documented under laboratory conditions, could translate into increased mortality if amphibian larvae are unable to metamorphose before the end of the season. Similarly, impaired behavioural response to prodding under laboratory conditions could translate to increased susceptibility to predators under field conditions.

- Impacts have been shown to be synergistically enhanced by interaction with some environmental factors. Of particular concern is that the effects of glyphosate herbicide may be greater when pond pH is 7 or higher (Edginton et al. 2004a). Amphibians in general avoid

acidic conditions, preferring to breed in ponds with higher pH, which could increase their vulnerability to glyphosate herbicide impacts.

- More detailed toxicological studies indicate that the toxicity of glyphosate herbicides arises not from the active ingredient, glyphosate, but from the surfactant, POEA.

- POEA is thought to interfere with the synthesis of collagen and to reduce the branchial cartilage in the gills of tadpoles and to cause lysis of gill epithelial cells in fish. This could result in loss of osmotic stability and asphyxiation. The toxic mode of action in terrestrial, postmetamorphic amphibians is not known at formulations without POEA surfactants, such as Rodeo, and formulations with other surfactants, such as Roundup Biactive, have reduced toxicity to amphibians. (pg. 31)

Govindarajulu, Purnima P. Ph.D., "Literature review of impacts of glyphosate herbicide on amphibians: What risks can the silvicultural use of this herbicide pose for amphibians in B.C.?" British Columbia Ministery of the Environment, Wildlife Report No. R-28, June 2008 http://www.llbc.leg.bc.ca/public/pubdocs/bcdocs/442206/finishdownloaddocument.pdf

Glyphosate safety opposing view #46 - "Based on the best available information, the Agency makes a Likely to Adversely Affect determination for the CRLF from the use of glyphosate. Additionally, the Agency has determined that there is the potential for modification of CRLF designated critical habitat from the use of the chemical.

This assessment indicates that direct effects to the terrestrial-phase CRLF eating broadleaf plants, small insects and small herbivorous mammals on a dietary-basis may be at risk following chronic exposure to glyphosate at application rates of 7.5 lb a.e./A and above (forestry, areas with impervious surfaces and rights of way). In addition, for one particular formulation (Registration No. 524-424), medium and large-sized CRLF's eating small herbivorous mammals on a dose-basis may be at risk following acute exposure at an application rate of 5.5 lb formulation/A (industrial outdoor uses). At the lowest application rate of 1.1 lb formulation/A, there is potential risk to medium-sized CRLF's eating small herbivorous mammals on a dose-basis (ornamental lawns and turf)." (Pg. 173)

Carey, Stephen, Tanja Crk, Colleen Flaherty, Pamela Hurley, James Hetrick, Keara Moore, and Silvia C. Termes "Risks of Glyphosate Use to Federally Threatened California Red-legged Frog (Rana aurora draytonii) -- Pesticide Effects Determination" A Report by the Environmental Fate and Effects Division Office of Pesticide Programs Washington, D.C. 20460, October 17, 2008 http://www.epa.gov/espp/litstatus/effects/redleg-frog/glyphosate/determination.pdf

Glyphosate safety opposing view #55 - "False Research
The EPA has twice caught scientists deliberately falsifying results at research laboratories hired by Monsanto to study glyphosate.

In 1983, the EPA revealed that Industrial Biotest Laboratories (IBL) routinely falsified results of their 1971 research performed on glyphosate. Tests performed at IBL included eleven out of nineteen total chronic toxicology studies on glyphosate; studies instrumental in its retaining registration in 1974.

In 1991, the EPA alleged that Craven Laboratories, another lab hired by Monsanto to study the effects of glyphosate, had falsified test results. Several methods were used, including manipulation of equipment and notebook entries."

"Alaska has an economic and cultural dependence on the welfare of salmon and other fish species, so it is particularly vital for Alaskans to know that glyphosate, and even more so glyphosate herbicides, are acutely toxic to fish.

The toxicity of glyphosate, which is most potently dangerous to younger fish, increases as water temperature rises. Ironically, the use of glyphosate causes water temperatures to increase for several years following treatment, as the herbicide kills shading vegetation. This is significant in more than one way for salmon, as juvenile salmon require cold water to thrive under even normal environmental circumstances.

The effects of glyphosate on fish have been documented using rainbow trout, which exhibited erratic swimming and labored breathing, effects which can increase the risk that fish will be eaten, as well as affecting ability to feed, migrate, and reproduce."

James, Carrie "Aerial Herbicide Spraying" SitNews (Ketchikan, Alaska) June 19, 2004 http://www.sitnews.us/0604Viewpoints/061904_carrie_james.html

Glyphosate safety opposing view #54 - "Relyea found that Roundup caused a 70 percent decline in amphibian biodiversity and an 86 percent decline in the total mass of tadpoles. Leopard Frog tadpoles and Gray Treefrog tadpoles were completely eliminated and Wood Frog tadpoles and toad (Bufo) tadpoles were nearly eliminated. One species of frog, Spring Peepers, was unaffected. "The most shocking insight coming out of this was that Roundup, something designed to kill plants, was extremely lethal to amphibians," said Relyea, who conducted the research at Pitt's Pymatuning Laboratory of Ecology. "We added Roundup, and the next day we looked in the tanks and there were dead tadpoles all over the bottom." "

Roundup Ravages Riparian Residents" The Center for North American Herpetology. NEWS RELEASE 18 April 2005 http://www.csupomona.edu/~cmbrady/courses/bio304/Roundup.htm

Glyphosate safety opposing view #56 - "Worldwide, amphibian populations are reported to be in a state of decline. Causative factors are incompletely understood. In ecosystems of northeastern North America, multiple stressors of pesticide contamination and acidification may be involved. As an initial component of a multi-tier investigation, the effects of forest-use herbicides Vision® (glyphosate) and Release® (triclopyr) are being studied using Xenopus laevis, Rana pipiens and Rana clamitans. Two different life stages of amphibians, embryos (blastula stage) and larvae (Gosner stage 25), are being used. Interactive effects of various herbicide concentrations and pH (5.5 and 7.5) are being studied using the organisms exposed in 96hr static renewal tests. The Frog Embryo Teratogenesis Assay - Xenopus (FETAX) protocol is used for the embryo stage for the determination of mortality, malformation and growth data. The larval exposures are being developed and refined to compare sensitivities to the FETAX assay. The larval 96hr static renewal exposure is followed by a 10-day water-only recovery period. Sensitivities are being compared to determine the appropriateness of the exotic amphibian Xenopus laevis for toxicity testing. Results on toxicity to date indicate that Vision® is more toxic to all species at pH 7.5 than at pH 5.5. The reverse has been shown for Release®. In addition, the larval stage has consistently been shown to be more sensitive than the blastula stage. Understanding species sensitivities and herbicide/pH interactions will aid in altering forestry herbicide use patterns to minimize effects on amphibians and other non-target organisms."

Edginton, Andrea N.Ph.D. "Multiple stressor effects in amphibians: herbicide/pH interaction" A presentation at the 5th Annual of the Canadian Amphibian and Reptile Conservation Network, September 22-25, 2000 http://www.carcnet.ca/past_meetings/2000/pastmeeting2000.php

Glyphosate safety opposing view #61 - "DENVER, Colo.— Recognizing the threat posed by expanding use of dangerous pesticides across 18 western states, competition from invading bullfrogs, nonnative diseases, and loss of wetlands, the U.S. Fish and Wildlife Service will announce tomorrow their conclusion that western populations of the northern leopard frog may warrant protection under the Endangered Species Act."

"The use of Roundup (a proprietary herbicide containing glyphosate), which is lethal to amphibians even at recommended levels according to recent studies, also threatens the western leopard frog. Roundup Ready crops (resistant to Roundup so the herbicide can be broadly applied to kill weeds) comprise a significant portion of crop acreage in the midwestern United States. In 2004, Roundup Ready soybean crops comprised 89 percent of all soybean crops in Iowa, 82 percent in Minnesota, 92 percent in Nebraska, 82 percent in North Dakota, and 95 percent in South Dakota."

Western Leopard Frogs Move a Step Closer to Protection -- U.S. Fish and Wildlife Service: Pesticides, Disease, Invasive Species, and Habitat Loss May Threaten Native Frogs with Extinction Center for Biological Diversity news release, June 30, 2009 http://www.biologicaldiversity.org/news/press_releases/2009/western-leopard-frog-06-30-2009.html

***Response***: *Forest Service Manual (FSM) 2672.42 directs that a biological assessment (BA) be prepared for all proposed projects that may have effects upon federally proposed, threatened, and endangered species to ensure that project decisions do not adversely affect federally listed species. In addition, FSM 2670.32 directs that a biological evaluation (BE) be prepared to evaluate the effects of proposed projects on Forest Service Region 5 designated sensitive species to ensure that project decisions do not result in the loss of species viability or create significant trends towards federal listing. Wildlife reports for the project analyze the potential effects of the proposed project for federally listed threatened, endangered, and proposed terrestrial species, and Region 5 listed sensitive terrestrial species.*

*Direction from 1909.15 states that "for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative". Disclosure of impacts to wildlife in the Terrestrial and Aquatic BE/BAs, and discussion of herbicide persistence and mobility in water and soil is discussed in the hydrology and soils reports for the projects, consistent with NEPA requirement. The potential for negative impacts to wildlife habitat and the risk of mortality to individuals is discussed and disclosed in the reports and is summarized in Chapter 3 of the DEIS.*

*Regarding the citations provided, cellular level studies are difficult to apply to real world exposure risks. Research conducted on whole organisms (e.g. rats, quail, etc.) using plausible exposure routes (e.g. dietary, direct spray) with glyphosate provide the best available science regarding risk from Forest Service applications. Such studies have been conducted, reviewed by EPA and in FS risk assessments, and form the basis of our conclusions.*

*Furthermore, monitoring results, based on over 150 surface water samples taken at locations in National Forests in California between 1991 and 2002, indicate that glyphosate applied by ground application seldom reached surface water even with "no spray" buffer widths as narrow as 10 feet (Bakke 2001). The highest concentration of glyphosate measured by the US Forest Service in Region 5 since 1991 was less than 30 micrograms per liter (ug/L). In addition, approximately 99 percent of the stream samples tested had concentrations less than the laboratory detection limit. The Minimum Detection Limit for glyphosate is 1 to 25 ug/L. The few instances where glyphosate has been detected in surface water have almost always been traced to accidental spills directly into a stream, the intentional spraying of the stream surface, or the spraying of vegetation on the streambank or on gravel bars in the channel (Bakke 2001).*

*Additionally, herbicide monitoring for glyphosate in surface water performed on the Eldorado National Forest between 1993 and 2007, showed no detection of glyphosate in any of 29 samples (Markman 2008).*

*Short term peak water contamination rates based on no stream buffers, are 0.1 mg a.i./L at the proposed application rate while long-term peak application rates are much lower. Water contamination rates would be expected to be much higher in the event of a spill, however design criteria have been developed to establish no spray buffers for set distances from waterways and to minimize the potential of an accidental spill occurring and entering a waterway. The concentration used by Relyea (2005a) was 3.8 mg a.i./L (milligrams of active ingredient per liter) more than twice the amount of the upper estimated peak water contamination rates. Based on the Aquatic Species Biological Evaluation for the project proposed glyphosate application is expected to not significantly impact amphibian species analyzed.*

*While there is a potential for negative effects to amphibians from herbicide application proposed in this project, stream buffers included in the design criteria are expected to minimize any exposure and therefore reduce the potential for any negative effects on amphibians. A site specific risk assessment has been conducted for the project to determine and disclose potential adverse effects of herbicide application on forest resources. This analysis is available in the project record.*

*Many of the cited references are targeted to spraying of genetically modified crops for human consumption. This project does not involve spraying crops for human consumption. Additionally, many of the cited references refer to Roundup in their discussion of effects from studies on glyphosate products. Many of these effects are specific to Round-up and do not necessarily have the same risk for glyphosate products in general. Roundup is not proposed for use in this project.*

*The study by Howe et al 2001 showed no chronic effects from glyphosate. Chronic effects were attributed to the surfactant blend and possibly to inert ingredients. Products proposed for use do not have a surfactant as part of the glyphosate product, however an adjuvant is proposed as part of the application. These adjuvants do not contain POEA.*

*This study by Relyea simulated a direct overspray of a small wetland which is not likely to be possible with directed ground based spray. Relyea used the commercial form of Roundup containing the POEA surfactant. Previous work in the Australian species showed that although the Australian species were less sensitive to Roundup, the death that occurred was completely due to the surfactant and not due to the active ingredient (glyphosate). Thus, inferences from Relyea's results should only apply to formulations that contain this common surfactant and not to other forms of glyphosate. Glyphosate formulations such as Rodeo and Accord do not contain a surfactant (they contain only glyphosate and water), but the consumer must purchase a separate surfactant and combine it with the product to make it effective. Products proposed for use do not have a surfactant as part of the glyphosate product, however an adjuvant is proposed as part of the application. Analysis of surfactants and additives proposed with this project is included in the Risk Assessment for the Blacksmith Project.*

**DA-Attachment 9a C** Glyphosate is hazardous for human health and can be linked diseases including cancer, kidney damage, and birth defects.

Glyphosate safety opposing view #3 - "In California, where there is a mandatory system of reporting pesticide poisoning, Glyphosate is the third most common cause of pesticide illness in farm workers. It is the most common form of reported pesticide poisoning in landscape gardeners."

"Two separate studies in Sweden have linked exposure to Glyphosate to Hairy Cell Leukemia and Non Hodgkins Lymphoma. These types of cancers were extremely rare, however non-Hodgkins lymphoma is the most rapidly increasing cancer in the Western world. It has risen by 73% in the USA

since 1973. Another study has found a higher incidence of Parkinson disease amongst farmers who used herbicides, including glyphosate."

"Other studies show that Glyphosate and commercial herbicides containing Glyphosate cause a range of cell mutations and damage to cell DNA. These types of changes are usually regarded as precursors to cancer and birth defects."

"Studies show that exposure to Glyphosate is associated with a range of reproductive effects in humans and other species. Research from Ontario, Canada found that a father's exposure to Glyphosate was linked to an increase in miscarriages and premature births in farm families."

"Glyphosate caused a decrease in the sperm count of rats and an increase in abnormal and dead sperms in rabbits. Pregnant rabbits exposed to Glyphosate had a decrease in the weight of their babies."

Leu, Andre "Monsanto's Toxic Herbicide Glyphosate: A Review of its Health and Environmental Effects" Organic Producers Association of Queensland, May 15, 2007
http://www.organicconsumers.org/articles/article_5229.cfm

Glyphosate safety opposing view #4 - "Symptoms of exposure to glyphosate include eye irritation, blurred vision, skin rashes, burning or itchy skin, nausea, sore throat and difficulty breathing, headache, lethargy, nose bleeds and dizziness.

In lab tests, glyphosate and herbicides containing glyphosate caused genetic damage to human and animal cells.

Studies of farmers and other people exposed to glyphosate herbicides link this exposure to increased risks of cancer, miscarriages and attention deficit disorder. Additional laboratory tests have confirmed the results of these studies.

Laboratory evidence indicates that glyphosate herbicides can reduce production of sex hormones.

Studies of glyphosate contamination of water are limited, but new results indicate that it can easily contaminate streams in both agricultural and urban areas.

Glyphosate herbicides cause more off-target damage incidents than all but one other herbicide — 2, 4-D.

Glyphosate herbicides cause genetic damage and harm to the immune system in fish. In frogs, glyphosate herbicides cause genetic damage and abnormal development."

Long, Cheryl. "Hazards of the World's Most Common Herbicide"
Mother Earth News, October/November 2005
http://www.motherearthnews.com/Organic-Gardening/2005-10-01/Hazards-of-the-Worlds-Most-Common-Herbicide.aspx

Glyphosate safety opposing view #5 - "Very low doses of some types of the herbicide Roundup can endocrine disruptor the formulations' toxicity may be tied to their "inactive" ingredients rather than the active weed-killing ingredient glyphosate.

French scientists report that a number of Roundup formulations tested at very dilute concentrations can alter hormone actions and cause human liver cells to die within 24 hours of treatment.

The toxicity of some of the formulations was independent of how much glyphosate - the active herbicide in Roundup - they contained, suggesting it is other "inert" ingredients that may alone - or in combination with each other and/or the weed killer - assault the cells. This study's results are similar to prior studies - as reported in a recent Environmental Health News article - that find human embryo cells are affected more by the Roundup formulations and an inert ingredient than by the active ingredient.

The levels of Roundup used in this study are similar to what is typically found in food crops or animal feed treated with Roundup. Because of this, it is possible that people, livestock and wildlife may be exposed to levels of the herbicide mix that can damage cells."

Martin, Negin P. Ph. D. "Monsanto's Roundup More Deadly to Liver Cells than Glyphosate Alone" Organic Consumers Assn., August 18, 2009
http://www.organicconsumers.org/articles/article_18842.cfm

Glyphosate safety opposing view #6 - "A recent study by eminent oncologists Dr. Lennart Hardell and Dr. Mikael Eriksson of Sweden [1], has revealed clear links between one of the world's biggest selling herbicide, glyphosate, to non-Hodgkin's lymphoma, a form of cancer [2].

In the study published in the 15 March 1999 Journal of American Cancer Society, the researchers also maintain that exposure to glyphosate 'yielded increased risks for NHL.' They stress that with the rapidly increasing use of glyphosate since the time the study was carried out, 'glyphosate deserves further epidemiologic studies.' "

"New Study Links Monsanto's Roundup to Cancer" Organic Consumers Association PRESS RELEASE, June 22, 2009 http://www.organicconsumers.org/Monsanto/glyphocancer.cfm

Glyphosate safety opposing view #8 - "Glyphosate was ranked third worst among all pesticides causing severe health problems among those working in agriculture in the State of California."

"The application of glyphosate causes the production of phyto-oestrogens in legumes. These phyto-oestrogens mimic the role of hormones in the bodies of mammals who ingest them. Hence, they may cause severe reproductive system disruptions. The data on estrogen-content of the plants submitted by Monsanto does not reflect the real scope of this problem, because the tested plants were grown in a glyphosate-free environment."

"Possible human health impacts of Monsanto's transgenic glyphosate-resistant soybeans"
Third World Network http://www.twnside.org.sg/title/weiz-cn.htm

Glyphosate safety opposing view #13 - "Our studies show that glyphosate acts as a disruptor of mammalian cytochrome P450 aromatase activity from concentrations 100 times lower than the recommended use in agriculture, and this is noticeable on human placental cells after only 18 hr, and it can also affect aromatase gene expression. It also partially disrupts the ubiquitous reductase activity but at higher concentrations. Its effects are allowed and amplified by at least 0.02% of the adjuvants present in Roundup, known to facilitate cell penetration, and this should be carefully taken into account in pesticide evaluation. The dilution of glyphosate in Roundup formulation may multiply its endocrine effect. Roundup may be thus considered as a potential endocrine disruptor.

Moreover, at higher doses still below the classical agricultural dilutions, its toxicity on placental cells could favor some reproduction problems."

Richard, Sophie Ph.D., Safa Moslemi Ph.D., Herbert Sipahutar, Nora Benachour and Gilles-Eric Seralini Ph.D., 2005 "Differential effects of glyphosate and Roundup on human placental cells and aromatase" Mindfully.org http://www.mindfully.org/Pesticide/2005/Glyphosate-Roundup-Placental24feb05.htm

Glyphosate safety opposing view #14 - "There are serious health implications from the use of this pesticide. There is a long list of reported toxic effects from glyphosate exposure and this Swedish study provides compelling evidence of the links between glyphosate and cancer."

"Swedish study shows links between glyphosate and cancer" The European NGO Network on Genetic Engineering, 1999 http://www.gene.ch/genet/1999/Jun/msg00018.html

Glyphosate safety opposing view #17 - "Glyphosate was formerly considered relatively non-toxic however there is now a considerable body of evidence for deleterious effects of Roundup, glyphosate and its adjuvants on a wide range of non-target species, including humans.

In 2003 the Danish Government announced unprecedented restrictions on glyphosate following analyses which demonstrated that it had been percolating through the soil and polluting the ground water at a rate 5-times that allowable for drinking water. Subsequently, another study confirmed that both glyphosate and its degradation product amino-methylphosphonic acid (AMPA) can leach through structured soils thereby posing a potential risk to the aquatic environment (5). More recently, an analytical method for glyphosate and AMPA based on liquid chromatography coupled to electrospray tandem mass spectrometry has been applied to water samples previously found to contain glyphosate (6). The glyphosate concentrations in the re-anaylzed samples were found to be 2 – 14 –fold higher than previously (6) suggesting that contamination of groundwater and other aquatic systems by glyphosate may be even greater than previously thought."

Brennan-Rieder, Denise Ph.D. June, 2008 "Proposed Cosmetic Pesticide Ban In Province Of Ontario Scientific Basis For Banning Both Sale And Use Of Synthetic Pesticides" http://www.pesticidereform.ca/RoundupDrBrennan-Rieder.PDF

Glyphosate safety opposing view #18 - "1. Glyphosate was ranked third worst among all pesticides causing severe health problems among those working in agriculture in the State of California.

2. The application of glyphosate causes the production of phyto-oestrogens in legumes. These phyto-oestrogens mimic the role of hormones in the bodies of mammals who ingest them. Hence, they may cause severe reproductive system disruptions. The data on estrogen-content of the plants submitted by Monsanto does not reflect the real scope of this problem, because the tested plants were grown in a glyphosate-free environment (see above)."

Tappeser, Beatrix Ph.D. and Christine von Weizsacker "Possible human health impacts of Monsanto's transgenic glyphosate-resistant soybeans" Third World Network http://www.twnside.org.sg/title/weiz-cn.htm

Glyphosate safety opposing view #21 - "Controversy exists around the use of herbicides more commonly used by home gardeners, such as, 2, 4-D and Roundup. A manufacturer supported review of studies found Roundup safe for use around humans while anti-herbicide groups cite studies that

find it affecting human embryonic, placental, and umbilical cells in vitro as well as testosterone development in mice."

Vinje, Eric, "Chemical Quandary: The Problem with Pesticides, Herbicides and Chemical Fertilizer" Planet Natural http://www.planetnatural.com/site/garden-chemicals.html

Glyphosate safety opposing view #22 - "According to Mr. Carrasco's research, even tiny quantities of glyphosate could cause embryonic malformations in frogs and thus, by extrapolation, may have implications for humans.

"I suspect the toxicity classification of glyphosate is too low ... in some cases this can be a powerful poison," Mr Carrasco told the Financial Times in an interview. He says residents near soya-producing areas began reporting problems from 2002, a couple of years after the first big harvests using genetically modified seeds, which were approved for use in Argentina in 1996.

Research by other Argentine scientists and evidence from local campaigners has indicated a high incidence of birth defects and cancers in people living near crop-spraying areas. One study conducted by a doctor, Rodolfo Páramo, in the northern farming province of Santa Fé reported 12 malformations per 250 births, well above the normal rate."

Weber, Jude and Hal Weitzman "Argentina Pressed to Ban Crop Chemical" The Financial Times, UK, May 29, 2009 http://www.gene.ch/genet/2009/Jun/msg00006.html

Glyphosate safety opposing view #23 - "Fish and aquatic invertebrates are more sensitive to Roundup than terrestrial organisms.[24] Glyphosate is generally less persistent in water than in soil, with 12 to 60 day persistence observed in Canadian pond water, yet persistence of over a year have been observed in the sediments of ponds in Michigan and Oregon."[9]

"The EU classifies Roundup as R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment."[25]

"Although Roundup is not registered for aquatic uses[26] and studies of its effects on amphibians indicate it is toxic to them,[27] scientists have found that it may wind up in small wetlands where tadpoles live, due to inadvertent spraying during its application. A recent study found that even at concentrations one-third of the maximum concentrations expected in nature, Roundup still killed up to 71 percent of tadpoles raised in outdoor tanks."[28]

"In 1996, Monsanto was accused of false and misleading advertising of glyphosate products, prompting a law suit by the New York State attorney general.[42] Monsanto had made claims that its spray-on glyphosate based herbicides, including Roundup, were safer than table salt and "practically non-toxic" to mammals, birds, and fish."[43]

"Environmental and consumer rights campaigners brought a case in France in 2001 for presenting Roundup as biodegradable and claiming that it left the soil clean after use; glyphosate, Roundup's main ingredient, is classed by the European Union as "dangerous for the environment" and "toxic for aquatic organisms". In January 2007, Monsanto was convicted of false advertising.[44] The result was confirmed in 2009."[45]

"On two occasions, the United States Environmental Protection Agency has caught scientists deliberately falsifying test results at research laboratories hired by Monsanto to study glyphosate.[46][47][48] In the first incident involving Industrial Biotest Laboratories, an EPA

reviewer stated after finding "routine falsification of data" that it was "hard to believe the scientific integrity of the studies when they said they took specimens of the uterus from male rabbits".[49][50][51] In the second incident of falsifying test results in 1991, the owner of the lab (Craven Labs), and three employees were indicted on 20 felony counts, the owner was sentenced to 5 years in prison and fined 50,000 dollars, the lab was fined 15.5 million dollars and ordered to pay 3.7 million dollars in restitution.[32][52][53] Craven laboratories performed studies for 262 pesticide companies including Monsanto."

"Monsanto has stated that the studies have been repeated, and that Roundup's EPA certification does not now use any studies from Craven Labs or IBT. Monsanto also said that the Craven Labs investigation was started by the EPA after a pesticide industry task force discovered irregularities."[54]

Wikipedia, the free encyclopedia, April 10, 2010 http://en.wikipedia.org/wiki/Roundup#Toxicity_2

Glyphosate safety opposing view #24 - "In the study published in the 15 March 1999 Journal of American Cancer Society, the researchers also maintain that exposure to glyphosate 'yielded increased risks for NHL.' They stress that with the rapidly increasing use of glyphosate since the time the study was carried out, 'glyphosate deserves further epidemiologic studies.' "

DaSilva, Guy MD, "New Study Links Monsanto's Roundup to Cancer" daSilva Institute - Antiaging & Functional Medicine http://www.dasilvainstitute.com/article.asp?artid=18&areacode=ITN

Glyphosate safety opposing view #25 - "These latest studies confirm a wealth of evidence on the toxicities of glyphosate and Roundup formulations [2] ( Glyphosate Toxic & Roundup Worse , SiS 26), and pinpoint the different sites of action, all of which result in cell death. Epidemiological studies have previously linked glyphosate to spontaneous abortions, non-Hodgkin lymphoma, and multiple myeloma. Laboratory studies showed that glyphosate inhibits transcription in sea urchin eggs and delays development. Brief exposures to glyphosate in rats caused liver damage, and adding the surfactant in Roundup had a synergistic effect, causing greater liver damage. Roundup was also found to be much more lethal to frogs than to weeds, and could have contributed to the global demise of amphibians within the past decades," [3]

Ho Mae-Win Ph.D. and Brett Cherry "Death by Multiple Poisoning, Glyphosate and Roundup" an Institute of Science in Society news release submitted to the USDA November 2, 2009 http://current.com/146im4c

Glyphosate safety opposing view #28 - "Glyphosate herbicides can have a range of impacts on human health, including genetic damage, skin tumours, thyroid damage, anaemia, headaches, nose bleeds, dizziness, tiredness, nausea, eye and skin irritation, asthma and breathing difficulties. Several studies have indicated a link between glyphosate herbicides and non-Hodgkin's lymphoma, a type of cancer.

Not surprisingly, considering the amount of money that Monsanto makes from sales of glyphosate products, the company plays down the health risks of glyphosate. Monsanto claims that glyphosate herbicides pose only a "low risk to human health" as long as glyphosate is used "according to label directions". "

Lang, Chris, "Glyphosate herbicide, the poison from the skies" WRM's bulletin Nº 97, August 2005 http://www.wrm.org.uy/bulletin/97/Glyphosate.html

Glyphosate safety opposing view #29 - "A 1999 study, A Case-Control Study of Non-Hodgkin Lymphoma and Exposure to Pesticides, (American Cancer Society, 1999), found that people exposed to glyphosate are 2.7 times more likely to contract non-Hodgkin Lymphoma.

A Finnish study shows that glyphostate decreases the defenses of enzymes of the liver and intestines.18 RoundUp, as a mixture of all its ingredients, has been shown to shut down a powerful antioxidant in the liver that detoxifies harmful compounds so they can be excreted through bile. A paper published in August 2000 shows that RoundUp alters gene expression and inhibits necessary steroid production by disrupting a particular protein expression. In 2002, a paper shows that RoundUp can also affect early cell division processes in embryos.19"

"chemicalWATCH Factsheet" Published by Beyond Pesticides, August 2009 http://www.beyondpesticides.org/pesticides/factsheets/Glyphosate.pdf

Glyphosate safety opposing view #31 - "JH: You said you had found that very low doses of glyphosate had caused these effects on aromatase. Are they the kind of doses that would be used in practical agriculture in the European Union?"

"GE-S: They are about ten to 100 times less than the doses used by agricultural workers. One has to be cautious because these are in vitro results but we do not want to wait for death when the precautionary principle suggests a need for measures to avoid any harmful effects on foetuses and children."

"Glyphosate disrupts of human hormones" An interview with Professor Gilles-Eric Seralini Ph.D. Published by ecochem http://www.ecochem.com/ENN_glyphosate(2).html

Glyphosate safety opposing view #32 - "The December/January 2010 issue of The Organic & Non-GMO Report featured an interview with Robert Kremer, an adjunct professor in the Division of Plant Sciences at the University of Missouri, whose research showed negative environmental impacts caused by glyphosate, the main ingredient in Monsanto's Roundup herbicide, which is used extensively with Roundup Ready genetically modified crops."

"The widespread use of glyphosate is causing negative impacts on soil and plants as well as possibly animal and human health. These are key findings of Don Huber, emeritus professor of plant pathology, Purdue University."

Roseboro, Ken "Monsanto's Glyphosate Problems: Scientist Warns of Dire Consequences with Widespread Use" The Organic and Non-GMO Report, Posted June 14, 2010 http://www.organicconsumers.org/articles/article_21039.cfm

Glyphosate safety opposing view #37 - "We have evaluated the toxicity of four glyphosate (G)-based herbicides in Roundup (R) formulations, from 105 times dilutions, on three different human cell types. This dilution level is far below agricultural recommendations and corresponds to low levels of residues in food or feed. The formulations have been compared to G alone and with its main metabolite AMPA or with one known adjuvant of R formulations, POEA. HUVEC primary neonate umbilical cord vein cells have been tested with 293 embryonic kidney and JEG3 placental cell lines. All R formulations cause total cell death within 24 h, through an inhibition of the mitochondrial succinate dehydrogenase activity, and necrosis, by release of cytosolic adenylate kinase measuring membrane damage. They also induce apoptosis via activation of enzymatic caspases 3/7 activity. This is confirmed by characteristic DNA fragmentation, nuclear shrinkage (pyknosis), and nuclear fragmentation (karyorrhexis), which is demonstrated by DAPI in apoptotic round cells. G provokes

only apoptosis, and HUVEC are 100 times more sensitive overall at this level. The deleterious effects are not proportional to G concentrations but rather depend on the nature of the adjuvants. AMPA and POEA separately and synergistically damage cell membranes like R but at different concentrations. Their mixtures are generally even more harmful with G. In conclusion, the R adjuvants like POEA change human cell permeability and amplify toxicity induced already by G, through apoptosis and necrosis. The real threshold of G toxicity must take into account the presence of adjuvants but also G metabolism and time-amplified effects or bioaccumulation. This should be discussed when analyzing the in vivo toxic actions of R. This work clearly confirms that the adjuvants in Roundup formulations are not inert. Moreover, the proprietary mixtures available on the market could cause cell damage and even death around residual levels to be expected, especially in food and feed derived from R formulation-treated crops."

Benachour, Nora and Gilles-Eric S ralini "Glyphosate Formulations Induce Apoptosis and Necrosis in Human Umbilical, Embryonic, and Placental Cells" Chem. Res. Toxicol., 2009, 22 (1), pp 97–105 DOI: 10.1021/tx800218n Publication Date (Web): December 23, 2008 http://pubs.acs.org/doi/abs/10.1021/tx800218n

Glyphosate safety opposing view #38 - "We exposed human liver HepG2 cells, a well-known model to study xenobiotic toxicity, to four different formulations and to glyphosate, which is usually tested alone in chronic in vivo regulatory studies. We measured cytotoxicity with three assays (Alamar Blue®, MTT, ToxiLight®), plus genotoxicity (comet assay), anti-estrogenic (on ERα, ERβ) and anti-androgenic effects (on AR) using gene reporter tests. We also checked androgen to estrogen conversion by aromatase activity and mRNA. All parameters were disrupted at sub-agricultural doses with all formulations within 24 h. These effects were more dependent on the formulation than on the glyphosate concentration. First, we observed a human cell endocrine disruption from 0.5 ppm on the androgen receptor in MDA-MB453-kb2 cells for the most active formulation (R400), then from 2 ppm the transcriptional activities on both estrogen receptors were also inhibited on HepG2. Aromatase transcription and activity were disrupted from 10 ppm. Cytotoxic effects started at 10 ppm with Alamar Blue assay (the most sensitive), and DNA damages at 5 ppm. A real cell impact of glyphosate-based herbicides residues in food, feed or in the environment has thus to be considered, and their classifications as carcinogens/mutagens/reprotoxics is discussed."

Gasnier, Céline Ph.D., Coralie Dumont Ph.D., Nora Benachour Ph.D., Emilie Clair Ph.D., Marie-Christine Chagnon Ph.D. and Gilles-Eric Séralini Ph.D. "Glyphosate-based herbicides are toxic and endocrine disruptors in human cell lines" Available online 17 June 2009 http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6TCN-4WJBC0R-1&_user=10&_coverDate=08%2F21%2F2009&_rdoc=1&_fmt=high&_orig=search&_origin=search&_sort=d&_docanchor=&view=c&_searchStrId=1591140451&_rerunOrigin=scholar.google&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=2adfd01803a911a1ff1eda15564d337e&searchtype=a

Glyphosate safety opposing view #39 - "In the study published in the 15 March 1999 Journal of American Cancer Society, the researchers also maintain that exposure to glyphosate 'yielded increased risks for NHL.' They stress that with the rapidly increasing use of glyphosate since the time the study was carried out, 'glyphosate deserves further epidemiologic studies.' "

"New Study Links World's Biggest Selling Pesticides to Cancer Swedish Study Finds Exposure to Glyphosate and MCPA Increases Risk for Non-Hodgkin's Lymphoma" Press Release PAN AP, June 21, 1999 http://www.mindfully.org/Pesticide/Monsanto-Roundup-Glyphosate.htm

Glyphosate safety opposing view #40 - "There is, indeed, direct evidence that glyphosate inhibits RNA transcription in animals at a concentration well below the level that is recommended for commercial spray application. Transcription was inhibited and embryonic development delayed in sea urchins following exposure to low levels of the herbicide and/or the surfactant polyoxyethyleneamine. The pesticide should be considered a health concern by inhalation during spraying [4]."

New research shows that a brief exposure to commercial glyphosate caused liver damage in rats, as indicated by the leakage of intracellular liver enzymes. In this study, glyphosate and its surfactant in Roundup were also found to act in synergy to increase damage to the liver [5].

Three recent case-control studies suggested an association between glyphosate use and the risk of non-Hodgkin lymphoma [6-8]; while a prospective cohort study in Iowa and North Carolina that includes more than 54 315 private and commercial licensed pesticide applicators suggested a link between glyphosate use and multiple myoeloma [9]. Myeloma has been associated with agents that cause either DNA damage or immune suppression."

Ho, Mae-Wan Ph.D. and Prof. Joe Cummins "Glyphosate Toxic & Roundup Worse" Institute of Science in Society report 07/03/05 http://www.i-sis.org.uk/GTARW.php

Glyphosate safety opposing view #41 - "New scientific studies link Roundup (glyphosphate), the most widely used herbicide in the world, to a host of health risks, such as cancer, miscarriages and disruption of human sex hormones."

Long, Cheryl "Hazards of the World's Most Common Herbicide" Mother Earth News, October/November 2005 http://www.motherearthnews.com/Organic-Gardening/2005-10-01/Hazards-of-the-Worlds-Most-Common-Herbicide.aspx

Glyphosate safety opposing view #42 - "A series of studies has found that farmers develop non-Hodgkin's lymphoma more often than other people do, but until now it has been difficult for scientists to explain why this increase occurs. New research, however, shows that exposure to the herbicide glyphosate, commonly sold as Roundup, is one explanation. The study was published in 2003 by researchers at the National Cancer Institute, the University of Nebraska Medical Center, Kansas University Medical Center, and the University of Iowa College of Medicine."

Study Links Herbicide use and Cancer A Northwest Coalition for Alternatives to Pesticides publication, 2010 http://www.pesticide.org/the-buzz/study-links-herbicide-use-and-cancer
Glyphosate safety opposing view #47 - "Glyphosate is the poster child for the global pesticide controversy due to its place in the ongoing debate over mega-farming and genetically engineered crops. Industry scientists say it's one of the safest herbicides in the world, while independent scientists have discovered potential links among the widespread use of glyphosate-based herbicides and non-Hodgkin's lymphoma, birth defects and even attention deficit disorder. Research also shows that additives like surfactants in glyphosate in herbicides like Roundup are more toxic than glyphosate itself and can increase the toxicity of glyphosate."

"The war on invasive species is a war on a fact of life. Humans have caused or exacerbated these species "invasions" by changing habitats and introducing species to new areas, and now we are trying to turn back the clock in an attempt to prevent nature from taking its new course. As long as people attempt to dominate the land, extract its resources and shape it to their liking, there will be money to be made and dramatic consequences for other livings things. The search for a balance between

supporting our collective desire to prosper and a healthy natural world is sure to spark more heated debates for years to come."

Ludwig, Mike "Special Investigation: The Pesticides and Politics of America's Eco-War" Published by Truthout, June 9, 2011 http://www.truth-out.org/pesticides-and-politics-americas-eco-war/1307539754

Glyphosate safety opposing view #48 - "We also observed a gradual loss of the r3 and r5domains in embryos treated with GBH (compare Figure 5E,Fwith D), which resembles the results observed in frog embryosin the krox-20 domains (Figures 1B and 2E). Hybridization with the c-shh probe showed that, as in Xenopus, the prechordalmesoderm domain is preferentially lost in GBH-treated chickembryos (compare Figure 5G with H,I). As the GBH concentra-tion increases, the expression along the embryonic dorsal midlinealso gradually disappears (Figure 5H,I).Therefore, our experiments with chick embryos further extendconclusions from studies about the teratogenic effects of GBHin amphibians to other vertebrate species discussion. The results presented above argue that both GBH and glyphosate itself interfere with key molecular mechanisms regulating early development in both Xenopus and chicken embryos, leading to congenital malformations. Sublethal doses of the herbicide (430 µM of glyphosate in 1/5000 dilutions of GBH) and injections leading to a final concentration of 8 to 12µM of glyphosate in the injected side of the embryo were sufficient to induce serious disturbances in the expression of slug, otx2, and shh. These molecular phenotypes were correlated with a disruption of developmental mechanisms involving the neural crest, embryonic dorsal midline formation, and cephalic patterning. Because glyphosate penetration through the cell membrane requires facilitation by adjuvants present in commercial formulations (5, 6), we tested the effects of glyphosate alone by directly microinjecting it into Xenopus embryos. The similarity of the phenotypes obtained in both situations suggests that they are attributable to the active principle of GBH and not to the adjuvants. We will discuss our results in the following context: (1) the correlation of our phenotypes with those observed in animal models with an impairment of RA signaling or deficits in the expression of critical genes that control embryonic development;(2) the probable mechanisms underlying the phenotypes induced by GBH and glyphosate; (3) possible correlations with clinical cases of human offspring exhibiting malformations in zones exposed to GBH. Misregulation of RA, shh, and otx2 Are Involved in Cephalic Malformations and Neural Crest-Derived Pheno-types Reminiscent of the Effects of GBH and Glyphosate. The phenotypes obtained after GBH treatments or injections of glyphosate alone are strikingly reminiscent of those observed as a consequence of an excess of RA signaling in vertebrates and humans. Acute or chronic increase of RA levels leads toteratogenic effects during human pregnancy and in experimental Figure 4. Phenotype induced by GBH is mediated by an increase of RA signaling (A). Analysis of RA activity with the reporter plasmidRAREZ. All embryos were injected with the reporter plasmid RAREZ, except for uninjected controls, and left untreated or were treated asindicated in the figure until stage 14-15, when they were processed. Results are expressed as arbitrary luminiscence units per µg of protein. A two-tailed t test was employed to analyze the significance in the difference of the means. ** $p < 0.01$; *** $p < 0.0001$. (B-G) WMISH for shh and otx2 at tailbud stages. (B) Control embryo. Notochord (n);floor plate (fp); brain (space between bars), eye (arrowhead). (C)Embryo treated with 1/5000 GBH manifesting microcephaly (space between bars), reduced eyes (arrowhead), diminished Shh signaling from the prechordal mesoderm (arrow), and shortened A-P axis (78%,n)9)." (Pg. 6)

Alejandra Paganelli, Victoria Gnazzo, Helena Acosta, Silvia L. López, and Andrés E. Carrasco "Glyphosate-Based Herbicides Produce Teratogenic Effects on Vertebrates by Impairing Retinoic Acid Signaling" Publicado por NOGAL DE VIDA, May 20, 2010 http://nogaldevida.blogspot.com/2010/08/glyphosate-based-herbicides-produce.html

Glyphosate safety opposing view #49 - “Although there is only a handful of studies on the safety of GM soybeans, there is considerable evidence that glyphosate—especially in conjunction with the other ingredients in Roundup—wreaks havoc with the endocrine and reproductive systems. ‘I think the concentration of glyphosate in the soybeans is the likely cause of the problem,’ says Ewen.

Glyphosate throws off the delicate hormonal balance that governs the whole reproductive cycle. ‘It’s an endocrine buster,’ says Ewen, ‘that interferes with aromatase, which produces estrogen.’ Aromatase is required by luteal cells to produce hormones for the normal menstrual cycle, but it’s those luteal cells that have shown considerable alterations in the rats fed GM soybeans.

Glyphosate is also toxic to the placenta, the organ which connects the mother to the fetus, providing nutrients and oxygen, and emptying waste products. In a 2009 French study at the University of Caen, scientists discovered that glyphosate can kill the cells in the outer layer of the human placenta (the trophoblast membrane), which in turn can kill the placenta. The placenta cells are, in Ewen’s words, ‘exquisitely sensitive to glyphosate.’ Only 1/500th the amount needed to kill weeds was able to kill the cells. The amount is so small, according to the study authors the ‘residual levels to be expected, especially in food and feed derived from R[oundup] formulation-treated crops’ could be enough to ‘cause cell damage and even [cell] death.’ Furthermore, the effect of the toxin may bioaccumulate, growing worse with repeated consumption from Roundup laden foods.

Smith, Jeffery “Genitically Modified Soy Diets Lead and Uterus Changes in Rats” foodconsumer.org, September 22, 2010
http://www.foodconsumer.org/newsite/Safety/gmo/genetically_modified_soy_diets_0910100128.html

Glyphosate safety opposing view #50 - “Such reports gained further traction after an Argentine government scientist, Andres Carrasco conducted a study, "Glyphosate-Based Herbicides Produce Teratogenic Effects on Vertebrates by Impairing Retinoic Acid Signaling" in 2009.

The study, published in the journal Chemical Research in Toxicology in 2010, found that glyphosate causes malformations in frog and chicken embryos at doses far lower than those used in agricultural spraying. It also found that malformations caused in frog and chicken embryos by Roundup and its active ingredient glyphosate were similar to human birth defects found in genetically modified soy-producing regions.

"The findings in the lab are compatible with malformations observed in humans exposed to glyphosate during pregnancy," wrote Carrasco, director of the Laboratory of Molecular Embryology at the University of Buenos Aires. "I suspect the toxicity classification of glyphosate is too low.”

“Fagan told HuffPost that among developmental biologists who are not beholden to the chemical industry or the biotechnology industry, there is strong recognition that Carrasco’s research is credible.”

"For me as a scientist, one of the reasons I made the effort to do this research into the literature was to really satisfy the question myself as to where the reality of the situation lies,” he added. “Having thoroughly reviewed the literature on this, I feel very comfortable in standing behind the conclusions Professor Carrasco came to and the broader conclusions that we come to in our paper.”

“We can’t figure out how regulators could have come to the conclusions that they did if they were taking a balanced took at the science, even the science that was done by the chemical industry itself.”

Graves, Lucia. “Roundup: Birth Defects Caused By World's Top-Selling Weedkiller, Scientists Say” by Lucia Graves Published on Friday, June 24, 2011 by Huffington Post http://www.commondreams.org/headline/2011/06/24-4

Glyphosate safety opposing view #52 - “A study released by an Argentine scientist earlier this year reports that glyphosate, patented by Monsanto under the name "Round Up," causes birth defects when applied in doses much lower than what is commonly used in soy fields.

The study was directed by a leading embryologist, Dr. Andres Carrasco, a professor and researcher at the University of Buenos Aires. In his office in the nation's top medical school, Dr. Carrasco shows me the results of the study, pulling out photos of birth defects in the embryos of frog amphibians exposed to glyphosate. The frog embryos grown in petri dishes in the photos looked like something from a futuristic horror film, creatures with visible defects—one eye the size of the head, spinal cord deformations, and kidneys that are not fully developed.

"We injected the amphibian embryo cells with glyphosate diluted to a concentration 1,500 times than what is used commercially and we allowed the amphibians to grow in strictly controlled conditions." Dr. Carrasco reports that the embryos survived from a fertilized egg state until the tadpole stage, but developed obvious defects which would compromise their ability to live in their normal habitats.

Trigona, Marie “GMO – Monsanto Soy Herbicide could Pose Health Risks” Americas Program, Center for International Policy (CIP), July 13, 2009 http://www.internationalnews.fr/article-36061426.html

Glyphosate safety opposing view #53 - “A study released by an Argentine scientist earlier this year reports that glyphosate, patented by Monsanto under the name “Round Up,” causes birth defects when applied in doses much lower than what is commonly used in soy fields.

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Trigona, Marie “Study released in Argentina puts glyphosate under fire” SOURCE Americas Program, Center for International Policy, USA, July 13, 2009 Published by Prism Webcast News http://prismwebcastnews.com/2009/08/06/study-released-in-argentina-puts-glyphosate-under-fire/

Glyphosate safety opposing view #57 - “We have evaluated the toxicity of four glyphosate (G)-based herbicides in Roundup (R) formulations, from 105 times dilutions, on three different human cell types. This dilution level is far below agricultural recommendations and corresponds to low levels of residues in food or feed. The formulations have been compared to G alone and with its main metabolite AMPA or with one known adjuvant of R formulations, POEA. HUVEC primary neonate umbilical cord vein cells have been tested with 293 embryonic kidney and JEG3 placental cell lines. All R formulations cause total cell death within 24 h, through an inhibition of the mitochondrial succinate dehydrogenase activity, and necrosis, by release of cytosolic adenylate kinase measuring membrane damage. They also induce apoptosis via activation of enzymatic caspases 3/7 activity. This is confirmed by characteristic DNA fragmentation, nuclear shrinkage (pyknosis), and nuclear fragmentation (karyorrhexis), which is demonstrated by DAPI in apoptotic round cells. G provokes only apoptosis, and HUVEC are 100 times more sensitive overall at this level. The deleterious effects

are not proportional to G concentrations but rather depend on the nature of the adjuvants. AMPA and POEA separately and synergistically damage cell membranes like R but at different concentrations.

Benachour, Nora and Gilles-Eric Seralini "Glyphosate Formulations Induce Apoptosis and Necrosis in Human Umbilical, Embryonic, and Placental Cells" Chemical Research in Toxicology, 2009, 22 (1), pp 97–105 http://pubs.acs.org/doi/abs/10.1021/tx800218n

Glyphosate safety opposing view #60 - "BUENOS AIRES – The herbicide used on genetically modified soy – Argentina's main crop – could cause brain, intestinal and heart defects in fetuses, according to the results of a scientific investigation released Monday.

Although the study "used amphibian embryos," the results "are completely comparable to what would happen in the development of a human embryo," embryology professor Andres Carrasco, one of the study's authors, told Efe."

"Carrasco said that the research found that "pure glyphosate, in doses lower than those used in fumigation, causes defects ... (and) could be interfering in some normal embryonic development mechanism having to do with the way in which cells divide and die."

"The companies say that drinking a glass of glyphosate is healthier than drinking a glass of milk, but the fact is that they've used us as guinea pigs," he said."

"Herbicide Used in Argentina Could Cause Birth Defects"Latin American Herald Tribune, April 30, 2009 http://www.progressiveconvergence.com/roundup-report-Argentina.htm

Glyphosate safety opposing view #62 - "Eduardo Neaves, a 12-year-old, went swimming in a canal in Coral Gables, Florida that was contaminated with four times the recommended amount of RoundUp herbicide. The child became completely paralyzed, and five years after the incident suffers residual nervous system damage.

The EPA, according to this article, in 1985 reported on the case of a 59-year-old woman in Tennessee who has suffered central nervous system damage after exposure to RoundUp.

Monsanto's original neurotoxicity studies on RoundUp were ruled invalid by the EPA due to "extensive gaps in the raw data supporting study findings and conclusions. There has been no requirement for a new study on the neurotoxicity of RoundUp."

"Anecdotal Evidence of RoundUp's Toxicity" Natures Country Store From July 1987 edition of The Progressive, and article entitled 'Weed Killer'
http://www.naturescountrystore.com/roundup/page7.html

Glyphosate safety opposing view #63 - "A group of international scientists has released a report detailing health and environmental hazards from the cultivation of genetically modified (GM) Roundup Ready soy and the use of glyphosate (Roundup®) herbicide.

The report, GM Soy: Sustainable? Responsible?,[1] highlights new research by Argentine government scientist, Professor Andrés Carrasco,[2] which found that glyphosate causes malformations in frog and chicken embryos at doses far lower than those used in agricultural spraying.

"The findings in the lab are compatible with malformations observed in humans exposed to glyphosate during pregnancy," said Carrasco."

Antoniou, Michael, Paulo Brack Ph.D., Andrés Carrasco Ph.D., John Fagan, Mohamed Ezz El-Din Mostafa Habib Ph.D., Paulo Yoshio Kageyama Ph.D., Carlo Leifert Ph.D, Rubens Onofre Nodari Ph.D., Walter A. Pengue Ph.D. "GM Soy: Sustainable? Responsible?"GM Watch, 13 September 2010 http://www.globalresearch.ca/index.php?context=viewArticle&code=ANA20101010&articleId=21382

Glyphosate safety opposing view #64 - "Three recent studies show that Roundup, which is used by farmers and home gardeners, is not the safe product we have been led to trust.

A group of scientists led by biochemist Professor Gilles-Eric Seralini from the University of Caen in France found that human placental cells are very sensitive to Roundup at concentrations lower than those currently used in agricultural application.

An epidemiological study of Ontario farming populations showed that exposure to glyphosate, the key ingredient in Roundup, nearly doubled the risk of late miscarriages. Seralini and his team decided to research the effects of the herbicide on human placenta cells. Their study confirmed the toxicity of glyphosate, as after eighteen hours of exposure at low concentrations, large proportions of human placenta began to die. Seralini suggests that this may explain the high levels of premature births and miscarriages observed among female farmers using glyphosate."

Heong, Chee Yoke "New Evidence Establishes Dangers of Roundup"Third World Resurgence, No. 176, April 2005 Re-published by Project Censored http://www.projectcensored.org/top-stories/articles/13-new-evidence-establishes-dangers-of-roundup/

Glyphosate safety opposing view #68 - "Two new studies indicate that Monsanto's herbicide, Roundup, is a hormone-disruptor and is associated with birth defects in humans.

Farm families that applied pesticides to their crops in Minnesota were studied to see if their elevated exposure to pesticides caused birth defects in their children. The study found that two kinds of pesticides -- fungicides and the herbicide Roundup -- were linked to statistically significant increases in birth defects. Roundup was linked to a 3-fold increase in neurodevelopmental (attention deficit) disorders. [EHP Supplement 3, Vol. 110 (June 2002), pgs. 441-449.]

"A recent test tube study reveals that Roundup can severely reduce the ability of mouse cells to produce hormones. Roundup interferes with a fundamental protein called StAR (steroidogenic acute regulatory protein). The StAR protein is key to the production of testosterone in men (thus controlling male characteristics, including sperm production) but also the production of adrenal hormone (essential for brain development), carbohydrate metabolism (leading to loss or gain of weight), and immune system function. The authors point out that "a disruption of the StAR protein may underlie many of the toxic effects of environmental pollutants." [EHP Vol. 108, No. 8 (August 2000), pgs. 769-776.]"

"Monsanto's Roundup Herbicide Threatens Public Health" Rachel's Environment and Health News, issue 751, Sept. 5, 2002. Reprinted by Organic Consumers Association http://www.organicconsumers.org/Monsanto/roundup92502.cfm Search on http://www.whale.to/b/roundup_h.html

Herbicide Safety Testing Opposing View #71 and Herbicide Label Directions Opposing View #3- "Used in yards, farms and parks throughout the world, Roundup has long been a top-selling weed killer. But now researchers have found that one of Roundup's inert ingredients can kill human cells, particularly embryonic, placental and umbilical cord cells.

Until now, most health studies have focused on the safety of glyphosate, rather than the mixture of ingredients found in Roundup. But in the new study, scientists found that Roundup's inert ingredients amplified the toxic effect on human cells—even at concentrations much more diluted than those used on farms and lawns.

One specific inert ingredient, polyethoxylated tallowamine, or POEA, was more deadly to human embryonic, placental and umbilical cord cells than the herbicide itself – a finding the researchers call "astonishing."

"The research team suspects that Roundup might cause pregnancy problems by interfering with hormone production, possibly leading to abnormal fetal development, low birth weights or miscarriages.

Monsanto, Roundup's manufacturer, contends that the methods used in the study don't reflect realistic conditions and that their product, which has been sold since the 1970s, is safe when used as directed. Hundreds of studies over the past 35 years have addressed the safety of glyphosate.

"Roundup has one of the most extensive human health safety and environmental data packages of any pesticide that's out there," said Monsanto spokesman John Combest. "It's used in public parks, it's used to protect schools. There's been a great deal of study on Roundup, and we're very proud of its performance."

The EPA considers glyphosate to have low toxicity when used at the recommended doses.

"Risk estimates for glyphosate were well below the level of concern," said EPA spokesman Dale Kemery. The EPA classifies glyphosate as a Group E chemical, which means there is strong evidence that it does not cause cancer in humans."

Weed-Whacking Herbicide Proves Deadly to Human Cells By Crystal Gammon and Environmental Health News June 23, 2009 http://www.scientificamerican.com/article.cfm?id=weed-whacking-herbicide-p

Herbicide Safety Testing Opposing View #73 and Herbicide Label Directions Opposing View #5- "A recent study which shows clear links between exposure to the herbicide glyphosate and non-Hodgkin's lymphoma (NHL), a form of cancer that afflicts the lymphatic system, has caused worldwide concern over the safety of the herbicide on humans.

The study was conducted by eminent oncologists Dr Lennart Hardell and Dr Mikael Eriksson of Sweden and published in the journal Cancer by the American Cancer Society on March 15."

"Monsanto's Argument:
Previous evaluations conducted by the US Environmental Protection Agency (EPA) and the World Health Organization (WHO) suggest that glyphosate is not a mutagenic or carcinogenic.

WHO and the Food and Agriculture Organization (FAO) have approved the safety of glyphosate residues in genetically-engineered Roundup Ready soyabeans.

PAN's Counter Argument:
The EPA and WHO evaluations were done more than five years ago and based mainly on data submitted to them by Monsanto.

These evaluations did conclude that "there is no evidence of mutagenicity or carcinogenicity" based on the available data, but they do not support definitive assertions that glyphosate "is not mutagenic or carcinogenic".

Previous EPA and WHO evaluations which made similar claims for other chemicals had to be revised as new evidence came to light.

The establishment of the WHO's Acceptable Daily Intake (ADI) is based on limited studies using limited parameters which do not account for vulnerable groups such as children, the elderly, the sick and other groups that might have increased susceptibility to glyphosate exposure."

"Concerns Over Glyphosate Use"The Sun (Malaysia), Friday August 20, 1999 http://www.poptel.org.uk/panap/archives/glywb.htm

Herbicide Safety Testing Opposing View #74 and Herbicide Label Directions Opposing View #6 - "To protect our health, the U.S. Environmental Protection Agency (EPA) sets maximum legal residue levels for every pesticide, for dozens of crops. But a new study in the respected journal Toxicology has shown that, at low levels that are currently legal on our food, Roundup could cause DNA damage, endocrine disruption and cell death. The study, conducted by French researchers, shows glyphosate-based herbicides are toxic to human reproductive cells."

"Solvents and surfactants, legally considered 'inert ingredients,' are mixed with glyphosate in products such as Roundup weed killer to create chemical formulations that increase mobility and more direct access to the cells. 'Those same factors that aid penetration into a plant, also aid penetration into the skin,' says Vincent Garry, professor emeritus of pathology at the University of Minnesota. 'These chemicals are designed to kill cells.' "

"Herbicide manufacturers are subject to fewer rules in the testing of inert ingredients than they are for active ingredients, explains Caroline Cox, research director at the Center for Environmental Health in Oakland, Calif. 'The tests the EPA requires for inert ingredients cover only a small range of potential health problems,' Cox says. 'Testing for birth defects, cancer and genetic damage are required only on the active ingredients. But we're exposed to both.' "

" 'Our bodies are gigantic spider webs of chemical communications that work in the parts-per-trillion range,' says Warren Porter, professor of zoology and environmental toxicology at the University of Wisconsin. 'When you put so-called 'insignificant' amounts of toxic chemicals into the mix, you have a molecular bull in a china shop. The possibilities for impact are endless.' "

Kimble-Evans, Amanda "Roundup Kills more than Weeds" Mother Earth News, December 2009/January 2010 http://www.motherearthnews.com/Sustainable-Farming/Roundup-Weed-Killer-Toxicity.aspx?page=2

Herbicide Safety Testing Opposing View #82 and Herbicide Label Directions Opposing View #14- "A study by French researchers at the University of Caen of glyphosate residue discovered that the inert ingredients in the herbicide (solvents, preservatives, surfactants) increased the toxic effect on human cells. According to the researchers, glyphosate residue can cause birth defects.

"This clearly confirms that the [inert ingredients] in Roundup formulations are not inert," wrote the study authors. "Moreover, the proprietary mixtures available on the market could cause cell damage and even death [at the] residual levels" found on Roundup-treated crops."

"Another study by Argentine scientists also found that glyphosate can cause birth defects at doses considerably lower than what is commonly used on crops, in this case, soybeans. The researchers injected amphibian embryo cells with glyphosate diluted to a concentration 1,500 times less than what is used commercially. The embryos grew into tadpoles with obvious birth defects."

"A 2001 study by Swedish oncologists discovered links between non-Hodgkin's lymphoma and glyphosate. The Swedish researchers found that Swedish people with non-Hodgkin's lymphoma were 2.3 times more likely to be exposed to glyphosate.

Monsanto spokesperson John Combest defended the safety of Roundup. "Roundup has one of the most extensive human health safety and environmental data packages of any pesticide that's out there. It's used in public parks, it's used to protect schools. There's been a great deal of study on Roundup, and we're very proud of its performance." "

Cheeseman, Gina-Marie, "Can A Company That Makes Roundup Be Sustainable?" TriplePundit, November 20th, 2009 http://www.triplepundit.com/2009/11/can-a-company-that-makes-roundup-be-sustainable/

Herbicide Safety Testing Opposing View #84 and Herbicide Label Directions Opposing View #16 - "BUENOS AIRES, Apr 15 , 2009 (IPS) - Glyphosate, the herbicide used on soybeans in Argentina, causes malformations in amphibian embryos, say scientists here who revealed the findings of a study that has not yet been published."

"The observed deformations are consistent and systematic," Professor Andrés Carrasco, director of the Laboratory of Molecular Embryology at the University of Buenos Aires medical school and lead researcher on the National Council of Scientific and Technical Research (CONICET), told the Inter Press Service news agency IPS.

Reduced head size, genetic alterations in the central nervous system, an increase in the death of cells that help form the skull, and deformed cartilage were effects that were repeatedly found in the laboratory experiments, said the biologist.

The news was reported Monday by the Argentine newspaper Página 12.

Monsanto's head of communications in Argentina, Fernanda Pérez Cometto, told IPS that the company has "several studies that show that the herbicide is harmless to humans, animals and the environment."

Valente, Marcela "Scientists Reveal Effects of Glyphosate" HEALTH-ARGENTINA, April 15 , 2009 http://www.ipsnews.net/news.asp?idnews=46516

Herbicide Safety Testing Opposing View #85 and Herbicide Label Directions Opposing View #17 - "It's amazing how many organics people still think it's OK to just use a bit of Roundup on those weeds in the bush or the driveway, or …. of course, not on the food, but the bush, that's OK isn't it?

Well, no, actually it isn't, and here's why: Roundup and various other formulations of the active ingredient glyphosate, have the potential to cause serious health and environmental effects, and have caused some severe poisoning problems.

Thorough PR by the developer of Roundup, Monsanto, has resulted in the widespread belief that glyphosate is 'safe'. Registration processes have generally supported this attitude, and there are no national or international bans. However, independent scientific studies and widespread poisonings in Latin America resulting from aerial application are beginning to reveal the true effects of the world's most widely used herbicide."

Watts, Meriel Ph.D. "Roundup's Not OK" ORGANIC NZ, November/December 2009
http://www.livingorganics.co.nz/roundups-not-ok.php

Herbicide Safety Testing Opposing View #92 and Herbicide Label Directions Opposing View #24 -

| Monsanto's Claims | Independent Research Findings |
|---|---|
| Roundup has a low irritational potential for eye and skin and otherwise is not a risk to human health. | Roundup is amongst the top most reported pesticides causing poisoning incidents (mainly skin irritation) in several countries. It also causes a range of acute symptoms including, recurrent eczema, respiratory problems, elevated blood pressure, allergic reactions. |
| Roundup does not cause any adverse reproductive effects | In laboratory tests on rabbits glyphosate caused long lasting, harmful effects on semen quality and sperm counts. |
| Roundup is not mutagenic in mammals. | DNA damage has been observed in laboratory experiments in mice organs and tissue. |
| Roundup is environmentally safe. | • In the agricultural environment, glyphosate is toxic to some beneficial soil organisms, beneficial arthropod predators, and increases crops' susceptibility to diseases.<br>• Sub-lethal doses of glyphosate from spray drift damages wildflower communities and can affect some species up to 20 metres away from the sprayer.<br>• The use of glyphosate in arable areas may cause dieback in hedgerow trees. |
| Roundup is rapidly inactivated in soil and water. | • Glyphosate is very persistent in soils and sediments.<br>• Glyphosate inhibited the formation of nitrogen fixing nodules on clover for 120 days after treatment.<br>• Glyphosate residues were found in lettuce, carrot, and barley when planted a year after glyphosate was applied. |
| Roundup is immobile and does not leach from soils. | • Glyphosate can readily desorb from soil particles in a range of soil types. It can be extensively mobile and leach to lower soil layers.<br>• Glyphosate can be carried by soil particles |

| | |
|---|---|
| | suspended in run off. |
| Roundup does not contaminate drinking water when used by local authorities on hard surfaces. | In the UK, levels of glyphosate above the EU limit have been detected by the Welsh Water Company every year since 1993. The Drinking Water Inspectorate recommends that glyphosate be monitored, particularly, in areas where it is used by local authorities on hard surfaces. |
| It is nearly impossible for glyphosate resistance to evolve in weeds. | In 1996, glyphosate resistant ryegrass was discovered in Australia. |
| Outcrossing in oilseed rape crops (and the transfer of genes from transgenic crops) occurs over a short distance and can be easily managed. | The densities of oil seed rape pollen are much higher and their dispersal patterns differ from around large fields compared to those found in experimental plots. Wind dispersal of pollen occurs over much greater distances and at higher concentrations than predicted by experimental plots. Significant levels of gene flow from transgenic oil seed crops is inevitable. |
| Roundup Ready crops will reduce levels of herbicide use. | Herbicide resistant crops will intensify and increase dependency on herbicide use in agriculture rather than lead to any significant reductions. A variety of herbicides will have to be reintroduced to control glyphosate resistant volunteers, feral populations of crops and resistant weeds. |
| ***Source: References cited in Health and Environmental Impacts of Glyphosate, (Details available from the Pesticides Trust [now PAN UK]).*** | |

PAN UK "Resistance to glyphosate"
This data was first published in Pesticides News No. 41, September 1998, page 5
http://www.pan-uk.org/pestnews/Issue/pn41/PN41p5.htm

Herbicide Safety Testing Opposing View #93 – "When Sofía lost her newborn, she soon realized that such losses were all-too-common in her small community of Ituzaingó Annex. Aerial spraying with Monsanto's herbicide RoundUp had climbed dramatically in the region as the number of acres planted with the company's "RoundUp Ready" soy crops grew.

Sofía and other concerned mothers went door to door collecting stories about health problems in each family — basically conducting the community's first-ever epidemiological study. "The Mothers of Ituzaingó" discovered the community's cancer rate to be 41 times the national average, and rates of neurological problems, respiratory diseases and infant mortality were astonishingly high. In response, the mothers launched a "Stop the Spraying!" campaign."

Schafer, Kristin, "Mother takes on Monsanto, wins global prize" Published in GroundTruth, April 13, 2012 Pesticide Action Network North America http://www.panna.org/blog/mother-takes-monsanto-wins-global-prize

Herbicide Safety Testing Opposing View #94 – "But humans are much bigger than insects and the doses to humans are miniscule, right? During critical first trimester development, a human is no bigger than an insect, so there is every reason to believe that pesticides could wreak havoc with the developing brain of a human embryo. But human embryos aren't out in corn fields being sprayed with

insecticides and herbicides, are they? A recent study showed that every human tested had the world's most popular pesticide, Roundup, detectable in their urine at concentrations between five and twenty times the level considered safe for drinking water.

The autism epidemic and the disappearance of bees are just two of many self-imposed disasters from allowing our world, including Utah, to be overwhelmed by environmental toxins. Environmental protection- including the smallest and most vulnerable among us - is human protection."

Moench, Brian, MD., "The Autism Epidemic and Disappearing Bees: A Common Denominator?" Published in Truthout, April 21, 2012 http://truth-out.org/news/item/8586-the-autism-epidemic-and-disappearing-bees-a-common-denominator

Herbicide Safety Testing Opposing View #97 – "Heavy use of the world's most popular herbicide, Roundup, could be linked to a range of health problems and diseases, including Parkinson's, infertility and cancers, according to a new study.

The peer-reviewed report, published last week in the scientific journal Entropy, said evidence indicates that residues of "glyphosate," the chief ingredient in Roundup weed killer, which is sprayed over millions of acres of crops, has been found in food.

Those residues enhance the damaging effects of other food-borne chemical residues and toxins in the environment to disrupt normal body functions and induce disease, according to the report, authored by Stephanie Seneff, a research scientist at the Massachusetts Institute of Technology, and Anthony Samsel, a retired science consultant from Arthur D. Little, Inc. Samsel is a former private environmental government contractor as well as a member of the Union of Concerned Scientists."

Carey Gillam, "Heavy use of herbicide Roundup linked to health dangers-U.S. study" Reuters, April 25, 2013 Source: http://www.reuters.com/article/2013/04/25/roundup-health-study-idUSL2N0DC22F20130425

The results of independent, unbiased research on glyphosate-containing herbicides indicate this chemical is causing: birth defects, non-Hodgkin's lymphoma, mitochondrial damage, cell asphyxia, miscarriages, attention deficit disorder, endocrine disruption, DNA damage, skin tumors, thyroid damage, hairy cell leukemia, Parkinson disease, premature births, decrease in the sperm count, harm to the immune system in fish, death of liver cells, severe reproductive system disruptions and chromosomal damage.

**Response:** *Forest Service Policy in FHS 2109.14 directs development of a risk assessment during pesticide use planning. A site specific risk assessment has been conducted for the Blacksmith project to determine and disclose potential adverse effects of herbicide application on forest resources and human health specifically associated with this project. This risk assessment identifies and examines the potential effects of the pesticides that are proposed in this project. This analysis includes hazard identification, exposure assessment and risk characterization.*

*The project specific risk assessment relies on the 2011 and 2003 SERA risk assessments on Glyphosate for a complete literature review and hazard assessment. In the preparation of this risk assessment, literature searches of glyphosate were conducted in the open literature using PubMed, TOXLINE as well as the U.S. EPA CBI files. Several reviews and risk assessments on glyphosate conducted by the U.S. EPA and others were also consulted. The human health and ecological risk assessments presented in this document are not, and are not intended to be, comprehensive summaries of all of the available information and these risk assessment do not cite all of the available literature.*

*Generally, the dose-response assessments used in Forest Service risk assessments adopt RfDs proposed by the U.S. EPA as indices of 'acceptable' exposure. An RfD is basically defined as a level of exposure that will not result in any adverse effects in any individual. The U.S. EPA RfDs are used because they generally provide a level of analysis, review, and resources that far exceed those that are or can be conducted in the support of most Forest Service risk assessments. In addition, it is desirable for different agencies and organizations within the federal government to use concordant risk assessment values. The most recent RfD on glyphosate is that proposed by the U.S. EPA Office of Pesticide Programs. This RfD of 2 mg/kg/day was proposed originally in the re-registration eligibility decision (RED) for glyphosate and was also used in the recent glyphosate pesticide tolerances. Using an uncertainty factor of 100 – 10 for sensitive individuals and 10 for species-to-species extrapolation xvi – U.S. EPA/OPP derived the RfD of 2 mg/kg/day, rounding the value of 1.75 mg/kg/day to one significant digit.*

*Findings from Hardell and Erikson (1999) are addressed in the SERA (2003 and 2011) Glyphosate risk assessments for the Forest Service. In this study, the increased risk of non-Hodgkin's lymphoma was not shown to be statistically significant. A similar study was reviewed by EPA (2002) and discussed in the glyphosate risk assessment (SERA 2003 and SERA 2011):*

- *EPA stated that, "This type of epidemiologic evaluation does not establish a definitive link to cancer. Furthermore, this information has limitations because it is based solely on unverified recollection of exposure to glyphosate-based herbicides." (EPA/OPP 2002).*
- *The glyphosate risk assessment states: "Given the marginal mutagenic activity of glyphosate and the failure of several chronic feeding studies to demonstrate a dose-response relationship for carcinogenicity and the limitations in the available epidemiology study, the Group E classification (evidence for non-carcinogenicity) given by the U.S. EPA/OPP (1993a, 2002) appears to be reasonable. (SERA 2003).*
- *Risk of NHL from glyphosate exposure is still adequately addressed by the 2003 risk assessment.*

*The recorded glyphosate cases have primarily been minor and reversible skin and eye irritation. Golddstien DA, Acquavella JF, Mannion RM, Farmer DR. (2002). An analysis of glyphosate data from the California Environmental Protection Agency Pesticide Illness Surveillance Program. Journal of Toxicology: Clinical Toxicology 40(7): 885-892.*

*Studies regarding effects to placental cells have limited applicability in assessing risk because umbilical and placental cells are not immersed directly in glyphosate or formulated Roundup in a real exposure. Research conducted on whole organisms (e.g. rats, quail, etc.) using plausible exposure routes (e.g. dietary, direct spray) with glyphosate provide the best available science regarding risk from Forest Service applications. Such studies have been conducted, reviewed by EPA and in FS risk assessments, and form the basis of our conclusions.*

*Additionally, many of the citations above contain specific references to effects from the widely available formulation Roundup, which contains a known toxic surfactant and is not proposed for use in this project.*

**DA-Attachment 9a D** Integrated pest management

Glyphosate safety opposing view #7 - "Safe, effective management and control of established exotic-weeds requires input from and the joint effort of scientists from several distinct disciplines, including biological control specialists, chemical control specialists, wildlife ecologists, animal science specialists, economists, and the public. The basic premise of IPM centers on employing first biological and other non-chemical pest controls, with the use of chemical pesticides only as a last resort. Since pesticide effects on public health and the environment cost the United States a conservatively estimated $9 billion per year, this should be a much welcome change."

Pimentel, David Ph.D., "True lntegrated Weed Management: Pesticides as a last resort" from a Beyond Pesticides publication, 2004
http://www.beyondpesticides.org/infoservices/pesticidesandyou/Fall%2004/Montanas%20War%20On%20Weeds.pdf

***Response:*** *All pesticide-use activities on National Forest System lands must be consistent with the standards and guidelines and other management direction in applicable Forest land and resource management plans (Forest plans) (36 CFR Part 219). Forest plans (FSM 1920) generally mandate principles of Integrated Pest Management (IPM) for management of forest pests such as insects, diseases, animals, and unwanted vegetation, including the Eldorado National Forest LRMP (1989). We agree that integrated pest management is important to use when planning for forest management. This project is designed to implement integrated pest management specifically through a combination of herbicide, and hand treatments where feasible, or where sensitive values exist and preclude the use of herbicides, as well as preventative treatments.*

**DA-Attachment 9a E Citations regarding genetically modified crops and testing of GMOs**

Glyphosate safety opposing view #30 - "The USDA first deregulated Roundup Ready alfalfa in 2005. Internal emails recently obtained by Truthout show that Monsanto worked closely with regulators to edit its original petition to deregulate the alfalfa. One regulator accepted Monsanto's help in conducting the USDA's original environmental assessment of the alfalfa.

Farmers and biotech opponents soon filed a lawsuit against the USDA to challenge the initial deregulation. In 2007, a federal court ruled that the USDA did not consider the full environmental impacts of Roundup Ready alfalfa and vacated the agency's decision to deregulate the alfalfa. Monsanto and its allies appealed the decision, and last year, the Supreme Court reversed the lower court's ruling, but ordered the USDA to produce an Environmental Impact Statement (EIS) on the alfalfa before allowing it back into America's fields.

The USDA released a final EIS on Roundup Ready alfalfa in late 2010, and the GE alfalfa was fully deregulated on January 27. The USDA went on to approve two more GE seeds within weeks of the alfalfa decision.

Roundup Ready alfalfa was deregulated just weeks after USDA Secretary Tom Vilsack was pressed by Republican Congressmen, some of whom recently received campaign contributions from Monsanto and the biotech industry, to dump a proposal to geographically isolate Roundup Ready alfalfa from organic and conventional alfalfa and, instead, legalize the GE seed without any government oversight.

The latest lawsuit filed by CFS and its allies argues that the final EIS ignores or downplays the threats Roundup Ready alfalfa poses to conventional alfalfa farms and the environment."

Ludwig, Mike "Farmers Sue USDA Over Monsanto Alfalfa – Again" Truthout, March 25, 2011
http://www.truth-out.org/farmers-sue-usda-over-monsanto-alfalfa-again68656

Glyphosate safety opposing view #51 - "This study was just routine," said Russian biologist Alexey V. Surov, in what could end up as the understatement of this century. Surov and his colleagues set out to discover if Monsanto's genetically modified (GM) soy, grown on 91% of US soybean fields, leads to problems in growth or reproduction. What he discovered may uproot a multi-billion dollar industry.

After feeding hamsters for two years over three generations, those on the GM diet, and especially the group on the maximum GM soy diet, showed devastating results. By the third generation, most GM soy-fed hamsters lost the ability to have babies. They also suffered slower growth, and a high mortality rate among the pups.

And if this isn't shocking enough, some in the third generation even had hair growing inside their mouths—a phenomenon rarely seen, but apparently more prevalent among hamsters eating GM soy."

"In addition to the GMOs, it could be contaminants, he said, or higher herbicide residues, such as Roundup. There is in fact much higher levels of Roundup on these beans; they're called "Roundup Ready." Bacterial genes are forced into their DNA so that the plants can tolerate Monsanto's Roundup herbicide. Therefore, GM soy always carries the double threat of higher herbicide content, couple with any side effects of genetic engineering.

Without detailed tests, no one can pinpoint exactly what is causing the reproductive travesties in Russian hamsters and rats, Italian and Austrian mice, and livestock in India and America. And we can only speculate about the relationship between the introduction of genetically modified foods in 1996, and the corresponding upsurge in low birth weight babies, infertility, and other problems among the US population. But many scientists, physicians, and concerned citizens don't think that the public should remain the lab animals for the biotech industry's massive uncontrolled experiment.

Alexey Surov says, "We have no right to use GMOs until we understand the possible adverse effects, not only to ourselves but to future generations as well. We definitely need fully detailed studies to clarify this. Any type of contamination has to be tested before we consume it, and GMO is just one of them."

Smith, Jeffery "Genetically Modified Soy Linked to Sterility, Infant Mortality" foodconsumer.org, September 22, 2010 http://www.foodconsumer.org/newsite/Watch-List/genetically_modified_soy_linked_to_sterility_infant_mortality_22.html

Glyphosate safety opposing view #66 - "In short, Monsanto's Roundup Ready technology is emerging as an environmental disaster. The question isn't why a judge demanded an environmental impact study of Roundup Ready sugar beets in 2010; it's that no one did so in 1996 before the technology was rolled out. After all, the Union of Concerned Scientists was already quite, well, concerned back then."

"As I wrote in June, rather than spark a reassessment of the wisdom of relying on toxic chemicals, the failure of Roundup Ready has the U.S. agricultural establishment scrambling to intensify chemical use. Companies like Dow Agriscience are dusting off old, highly toxic poisons like 2, 4-D and promoting them as the "answer" to Roundup's problems."

Philpott, Tom. "Why Monsanto is paying farmers to spray its rivals' herbicides" Grist, October 20, 2010 http://www.grist.org/article/food-2010-10-20-why-monsanto-paying-farmers-to-spray-rival-herbicides/

Herbicide Safety Testing Opposing View #79 and Herbicide Label Directions Opposing View #11 - "A recent study by eminent oncologists Dr. Lennart Hardell and Dr. Mikael Eriksson of Sweden [1], has revealed clear links between one of the world's biggest selling herbicide, glyphosate, to non-Hodgkin's lymphoma, a form of cancer [2]."

“In the study published in the 15 March 1999 Journal of American Cancer Society, the researchers also maintain that exposure to glyphosate 'yielded increased risks for NHL.' They stress that with the rapidly increasing use of glyphosate since the time the study was carried out, 'glyphosate deserves further epidemiologic studies.' “

“O' Neill concluded: 'The EPA when authorising Monsanto's field trials for Roundup-ready sugar beet did not consider the issue of glyphosate. They considered this to be the remit of the Pesticides Control Service of the Department of Agriculture. Thus nobody has included the effects of increasing the use of glyphosate in the risk/benefit analysis carried out. It is yet another example of how regulatory authorities supposedly protecting public health have failed to implement the 'precautionary principle' with respect to GMOs.' “

O' Neill, Sadhbh “RoundUp—Lymphoma Connection” Genetic Concern, June 22, 1999 http://www.hancock.forests.org.au/docs/herbicidesUpdate0602.htm

Herbicide Safety Testing Opposing View #86 and Herbicide Label Directions Opposing View #18 - Research on genetically modified seeds is still published, of course. But only studies that the seed companies have approved ever see the light of a peer-reviewed journal. In a number of cases, experiments that had the implicit go-ahead from the seed company were later blocked from publication because the results were not flattering. "It is important to understand that it is not always simply a matter of blanket denial of all research requests, which is bad enough," wrote Elson J. Shields, an entomologist at Cornell University, in a letter to an official at the Environmental Protection Agency (the body tasked with regulating the environmental consequences of genetically modified crops), "but selective denials and permissions based on industry perceptions of how ’friendly’ or ’hostile’ a particular scientist may be toward [seed-enhancement] technology."

Shields is the spokesperson for a group of 24 corn insect scientists that opposes these practices. Because the scientists rely on the cooperation of the companies for their research - they must, after all, gain access to the seeds for studies - most have chosen to remain anonymous for fear of reprisals. The group has submitted a statement to the EPA protesting that "as a result of restricted access, no truly independent research can be legally conducted on many critical questions regarding the technology."

It would be chilling enough if any other type of company were able to prevent independent researchers from testing its wares and reporting what they find - imagine car companies trying to quash head-to-head model comparisons done by Consumer Reports, for example. But when scientists are prevented from examining the raw ingredients in our nation’s food supply or from testing the plant material that covers a large portion of the country’s agricultural land, the restrictions on free inquiry become dangerous.

“Do Seed Companies Control GM Crop Research?” Scientific American, Editorial, August 2009 edition, published 21 July 2009 Reprinted by Combat-Monsanto.org http://www.combat-monsanto.co.uk/spip.php?article399

Herbicide Safety Testing Opposing View #90 and Herbicide Label Directions Opposing View #22 - “ "The U.S. response (to questions about biotech crop safety) has been an extremely patronizing one. They say 'We know best, trust us,'" added Gurian-Sherman, now a senior scientist at the Union of Concerned Scientists, a nonprofit environmental group.”

“So far, that confidence has been lacking. Courts have cited regulators for failing to do their jobs properly and advisers and auditors have sought sweeping changes.”

"The developers of these crop technologies, including Monsanto and its chief rival DuPont, tightly curtail independent scientists from conducting their own studies. Because the companies patent their genetic alterations, outsiders are barred from testing the biotech seeds without company approvals."

"The agreements disallow any research that is not first approved by the companies. "No truly independent research can be legally conducted on many critical questions regarding the technology," the scientists said in their statement."

"Outside researchers have also raised concerns over the years that glyphosate use may be linked to cancer, miscarriages and other health problems in people."

Gillam, Carey "Patents Trump Public Interest in Monsanto's Ag Empire - Special Report: Are Regulators Dropping the Ball on Biocrops?" Reuters, April 13, 2010
http://www.commondreams.org/headline/2010/04/13-0

Herbicide Safety Testing Opposing View #95 – "A formula seems to have been made to not only ruin the agricultural system, but also compromise the health of millions of people worldwide. With the invent of Monsanto's Roundup Ready crops, resistant superweeds are taking over farmland and public health is being attacked. These genetically engineered crops are created to withstand large amounts of Monsanto's top-selling herbicide, Roundup. As it turns out, glyphosate, the active ingredient in Roundup, is actually leaving behind its residue on Roundup Ready crops, causing further potential concern for public health."

Barrett, Mike, "Monsanto's Roundup Ready Crops Leading to Mental Illness, Obesity"
Natural Society, December 15, 2011 Source: http://naturalsociety.com/monsanto-roundup-ready-crops-decreased-gut-flora/

Herbicide Label Directions Opposing View #26 - "The extraordinary influence of the biotechnology industry has made U.S. regulation of GM crops largely a rubber-stamp process designed to increase public confidence in, rather than ensure the safety of, genetically modified foods. Weaknesses shared by all three agencies include uncritical reliance on the data and conclusions of the financially interested GM crop developer in regulatory decisionmaking; dogmatic adherence to politically-motivated doctrines such as "substantial equivalence" designed to ease companies' regulatory path to approval; and blindness to the substantial economic harm suffered by U.S. farmers thanks to governmental and industry negligence. As continuing contamination episodes provoke more scientifically-oriented regulators in Europe and Japan to reject shipments of U.S. foodstuffs with untested GM content, one can only hope that the often severe economic fallout for U.S. farmers (if nothing else) will convince U.S. regulators to leave politics behind, and finally adopt a more objective, stringent, and science-based regulatory system."

Is Government Up to Task
Published in the January/February 2007 issue of Biotechnology
http://www.centerforfoodsafety.org/pubs/FDLI%20Paper%20-%20Jan-Feb%202007.pdf

***Response:*** *Use of genetically modified crops or treatment of genetically modified crops is not a part of this project proposal, therefore opinions, research methods, conclusions, and questions specific to genetically modified crops are not relevant to this project analysis.*

**DA-Attachment 9a F Citations related to NEPA analysis procedures**

Glyphosate safety opposing view #58 - "Case example: Okanogan NF Integrated Weed Management Environmental Assessment (EA) (1997, 1999)
The Okanogan NF Integrated Weed Management EA for 1997 received many comments from the public asking for documentation and analysis of the risks of herbicides to human health and safety, yet all of these concerns for safety were lumped into a single issue on p. 15-16:

Noxious weed populations can degrade recreational experiences by decreasing the desirability of campsites, replacing native plant populations in developed and dispersed areas and changing the scenery. Herbicide contact could pose risks to human health through skin exposure, inhalation, or ingestion. Some noxious weeds also pose risks to human health.

The marginalization of human health as mere "issues" rather than actual hazards suggests that there was never any intention of questioning the safety or use of herbicides, except in a very limited fashion, and this is borne out in the analysis section.

Two years later the Okanogan NF prepared a second EA (1999) and through another public comment process, the issues identified through public comments were exactly the same.

Why are the issues of public health ignored? According to the rationalization given in the EA (Okanogan NF, 1997, p. 17), public comments were addressed in a "higher level document". In other words, concerns about human health and safety were not considered in the EA. By its limited scope, the agency effectively avoids having to consider issues that it doesn't want to.

The purpose of an EA is to assess a problem, propose and evaluate alternatives and select the most effective remedy, which should be the least harmful to the environment. In this case, the alternative to use herbicides had been selected prior to doing an analysis. The EA was only used to justify a predetermined decision rather than truly explore alternatives."

From Chapter 3. Adverse impacts in the report: "Risky Business: Invasive species management on National Forests - A review and summary of needed changes in current plans, policies and programs" A publication of the Kettle Range Conservation Group, February, 2001
http://kettlerange.org/weeds/Chapter-3.html

***Response:*** *Forest Service policy is that for each alternative considered in detail, analyze and document the environmental effects, including the effectiveness of the mitigation measures that would result from implementing each alternative, including the no-action alternative (FSH 1909.15). Regarding pesticide use, Forest Service Policy in FHS 2109.14 directs development of a risk assessment during pesticide use planning. The Risk Assessment for the Blacksmith Project includes a hazard identification, exposure assessment and risk characterization. Individual resource reports for the project document the potential resource damage that is likely to occur because of proposed activities for each of the action alternatives and in the absence of action in the analysis of the no action alternative. These reports are summarized in Chapter 3 of the EIS.*

**DA-Attachment 9a G** Citations specific to unrelated projects.

Glyphosate safety opposing view #65 - "Colombia - A Colombian court on Friday ordered the government to suspend immediately aerial spraying of drug crops with the herbicide glyphosate, a potential blow to President Andres Pastrana's anti-cocaine offensive.

Bogota Judge Gilberto Reyes Delgado, ruling in favor of indigenous groups that had protested the spraying program, said he had asked the government to provide studies on glyphosate's effects on the environment and human health."

"Ecuador recently asked Colombia to stop aerial crop spraying near the border the two nations share over fears glyphosate could harm Ecuadoreans' health and damage subsistence crops in the region's jungle towns."

"Columbian Court Suspends Aerial Spraying of Roundup on Drug Crops"
Reuters, July 27, 2001 Republished by Mindfilly.org http://www.mindfully.org/Pesticide/Roundup-Drug-Spray-Colombia.htm

Herbicide Safety Testing Opposing View #91 and Herbicide Label Directions Opposing View #23 - "Defining Toxic
Asbestos is an extreme example, which I use here and in my book Pick Your Poison: How Our Mad Dash to Chemical Utopia is Making Lab Rats of Us All to make a point, but many other "nontoxic" products could be full of toxic chemicals. I'm hoping this essay leaves you with a general distrust of the nontoxic label, both in the past and currently. When you see "nontoxic" on a product, keep the following facts in mind:

"Nontoxic" can still legally mean that there are no immediate, acute hazards as determined by the LD50 and LC50 tests.

"Nontoxic" may mean there are little or no chronic data available on the substance. If the substance is not acutely toxic, and one can't prove it is toxic in the long term, many manufacturers feel that they have the right to call it nontoxic. Even if there are studies showing that the substance is toxic, manufacturers in the United States have traditionally waited for absolute, unequivocal proof, which in most cases is never available because we don't study our chemicals.

An art material is "nontoxic" if a toxicologist paid by the manufacturer decides it is safe. The dramatic failure in this labeling procedure was illustrated with the lead ceramic glazes and asbestos-containing materials such as talc. Asbestos-containing talcs are still found in some art and craft materials today.

Some art materials that have never been evaluated by a toxicologist may be labeled "nontoxic" illegally due to weak enforcement of the art materials labeling law. For example, in 1995, a cameraman and a reporter from Channel 9 in New York went with me to a major art materials outlet. That night on the evening news, we showed viewers about a dozen imported products that did not conform to the law, some labeled "nontoxic," which were being sold illegally. This is still true today, and a little research will lead you to many sources of noncompliant "nontoxic" products.

Labeling of ordinary consumer products is pretty much up to the manufacturer and its paid advisers. Because there is no enforcement mechanism in the regulations for the chronic hazard labeling of ordinary consumer products, there is not much incentive to provide warnings.

There is no regulatory requirement to warn consumers about damage to most of the body's organs, such as the lungs, the liver, and the kidneys. Only four types of chronic hazards are covered by the Federal Hazardous Substances Act regulations. These are cancer, and developmental, reproductive, and neurological damage."

Rossol, Monona "Say What? A Chemical Can Damage Your Lungs, Liver and Kidneys and Still Be Labeled "Non-Toxic"?" Ms. Rossol is a research chemist, author and member of the American Industrial Hygiene Association May 9, 2011
http://www.alternet.org/story/150888/say_what_a_chemical_can_damage_your_lungs%2C_liver_and_kidneys_and_still_be_labeled_%22non-toxic%22?page=entire

It's been the official mantra of pesticide companies for decades: "The dose makes the poison." While it makes intuitive sense — you'd think that the more of a chemical you're exposed to, the sicker you'll get — the science has, in fact, been saying otherwise for years.

A team of 12 scientists recently released a report calling on EPA to completely revamp the way they evaluate chemicals, to better reflect this now fully understood reality: Tiny amounts of certain chemicals can have devastating effects on human health.

It's all about the hormones. Our systems are largely regulated by these powerful chemical messengers, and the intricate process of fetal development is all but completely orchestrated by them.

The bad news is, some synthetic chemicals look a lot like our natural hormones to the "hormone receptor" trigger cells that turn many functions on and off in our bodies. Particularly for the developing systems of infants and children, it's often the timing — not the dose — that matters most."

Schafer, Kristin, "Low doses matter hugely, say scientists" Published in Groundtruth, April 2, 2012
Source: http://www.panna.org/blog/low-doses-matter-hugely-say-scientists

***Response:*** *Citations do not relate to comments presented on the Blacksmith project. This project does not include aerial spraying. This project will follow all applicable laws and regulations governing the use of pesticides on National Forest system lands. Risk is evaluated based upon standard protocols for risk assessment. As described in the risk assessment for the project "The analysis of the potential human health effects of the use of pesticides was accomplished using the methodology of risk assessment generally accepted by the scientific community (National Research Council 1983, U.S. EPA 1986). In essence, this pesticide risk assessment consists of comparing doses that people may get from applying the pesticide (worker doses) or from being near and application site (public doses) with the U.S. Environmental Protection Agency's (U.S. EPA) established Reference Doses (RfD), a level of exposure that result in no adverse effect over a lifetime or chronic exposures."*

**DA-Attachment 9a H** Citations regarding tests on labels safety requirements

Herbicide Safety Testing Opposing View #69 and Herbicide Label Directions Opposing View #1 - "Tests done on glyphosate to meet registration requirements have been associated with fraudulent practices.

Laboratory fraud first made headlines in 1983 when EPA publicly announced that a 1976 audit had discovered "serious deficiencies and improprieties" in toxicology studies conducted by Industrial Biotest Laboratories (IBT).44 Problems included "countless deaths of rats and mice that were not reported," "fabricated data tables," and "routine falsification of data."44

IBT was one of the largest laboratories performing tests in support of pesticide registrations.44 About 30 tests on glyphosate and glyphosate-containing products were performed by IBT, including 11 of the 19 chronic toxicology studies.45 A compelling example of the poor quality of IBT data comes from an EPA toxicologist who wrote, "It is also somewhat difficult not to doubt the scientific

integrity of a study when the IBT stated that it took specimens from the uteri (of male rabbits) for histopathological examination."46 (Emphasis added.)

In 1991, laboratory fraud returned to the headlines when EPA alleged that Craven Laboratories, a company that performed contract studies for 262 pesticide companies including Monsanto, had falsified test results.47 "Tricks" employed by Craven Labs included "falsifying laboratory notebook entries" and "manually manipulating scientific equipment to produce false reports."48 Roundup residue studies on plums, potatoes, grapes, and sugarbeets were among the tests in question.49

The following year, the owner/president of Craven Laboratories and three employees were indicted on 20 felony counts. A number of other employees agreed to plead guilty on a number of related charges.50 The owner was sentenced to five years in prison and fined $50,000; Craven Labs was fined 15.5 million dollars, and ordered to pay 3.7 million dollars in restitution.48

Although the tests of glyphosate identified as fraudulent have been replaced, these practices cast shadows on the entire pesticide registration process."

Cox, Caroline, "Quality of Toxicology Testing" Journal of Pesticide Reform, Volume 15, Number 3, Fall 1995. Northwest Coalition for Alternatives to Pesticides, Eugene, OR. Glyphosate, Part 1: Toxicology http://www.inspiringlandscapes.com/hope/glyphos8.htm

Herbicide Safety Testing Opposing View #70 and Herbicide Label Directions Opposing View #2 - "In 2004 the "Counterpart Regulations," strongly supported by industry, were proposed to streamline EPA's pesticide review process at the expense of the most vulnerable life forms in our country, Endangered and Threatened Species aka Listed Species (1,265 species are "Listed"). The critical change these regulations bring about is elimination of the requirement for consultations with wildlife experts at the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) by EPA reviewers evaluating adverse impacts of pesticides on Listed Species and their habitats. RCC opposed the Counterpart Regulations with comments, but, sadly, the Regulations were issued in final form on July 29, 2004, despite our objections. Over 125,000 public comments were received by the Fish and Wildlife Service, and they ran 2 to 1 against the Counterpart Regulations.

RCC Insight:
Apparently, the public's concerns did not make a difference to the people at FWS and NMFS, or did they? We wonder whether the scientists involved with protecting wildlife at both "Services" would want to be bringing their experience and knowledge to bear on decisions made by EPA with respect to pesticides, if it were up to them. Perhaps they would prefer to be part of the evaluation process and they do not concur with finalizing the Counterpart Regulations. However, the fact is that decision-makers, by finalizing these changes, support an action that will weaken Endangered Species' protection from poisoning and habitat degradation due to pesticides. This latest environmental rollback can mean increasingly hazardous conditions in rivers, lakes and wetlands. A further risk is weakening of the Endangered Species Act itself. (Text of our "Comments" is available through our website -- rachelcarsoncouncil.com)"

"Species from Pesticides – Weakened" Rachel Carson Council Inc., Issues & Insights October, 2004 http://www.rachelcarsoncouncil.org/index.php?page=issues-insights-october-2004

***Response:*** *Citations question the legal validity of tests performed to establish label safety requirements. The proposed project activities would follow all appropriate laws, policies, and regulations governing the use of pesticides, as required by the U.S. Environmental Protection Agency, the California Department of*

*Pesticide Regulation, and the Forest Service Policy pertaining to pesticide-use. It is unsubstantiated that illegal activities have guided safety requirements for product use.*
**DA-Attachment 9a I** Citations regarding legal questions about pesticide regulation

Herbicide Safety Testing Opposing View #77 and Herbicide Label Directions Opposing Views #9 and #25 - "FACT: The EPA (Environmental Protection Agency) does not test pesticides for safety. It relies on the manufacturers' test data to make judgments. Recent probes have found that the experiments, on which these data have been based, have been designed to show only what the manufacturer would like them to show. This criticism of self-serving misrepresentation can be aimed equally validly at irresponsible experimenters bent on demonstrating toxicity of a given pesticide.

It seems that however this problem is approached, the EPA needs to take more affirmative action and responsibility. This is not likely to happen, as the EPA's research program increasingly relies on corporate joint venture, according to agency documents obtained by Public Employees for Environmental Responsibility (PEER). Indeed, a study by the Government Accountability Office (the investigative arm of Congress – the same people who first told us of the $640 toilet seats and $1,000 hammers purchased with Department of Defense money), in April 2005, concluded that the EPA lacks safeguards to "evaluate or manage potential conflicts of interest" in corporate research agreements, as they are taking money from corporations that they are supposed to be regulating."

"MYTH: The Government tests pesticides for safety before they are sold" Wild Ones Journal, Nov 17, 2006 http://www.for-wild.org/download/roundupmyth/roundupmyth.html

Herbicide Safety Testing Opposing View #78 and Herbicide Label Directions Opposing View #10 - "FACT: The primary focus of the Federal Insecticide, Fungicide, and Rodenticide Act, originally enacted in 1947, was to provide federal control of pesticide distribution, sale, and use. The act has been amended many times over the years. One of these amendments permitted manufacturers protection of trade secrets. It is under these provisions that manufacturers circumvent a law that originally intended all information to be known – at least by the EPA. The fact that today, with mass spectrometers, chemistry can determine the makeup of the inert ingredients, leaves only the end consumer in the dark.

In 1990 the Office of the Attorney General of New York filed a request that all inert ingredients in pesticides be made public. The request was repeated a number of times through the decade, to no avail. Sixteen years later, in August of 2006, the attorneys general of 14 states have filed a similar petition to the EPA. This time the EPA is obliged to respond within a given time period."

"MYTH: There are laws…" Wild Ones Journal, Nov 17, 2006 http://www.for-wild.org/download/roundupmyth/roundupmyth.html

Herbicide Safety Testing Opposing View #80 and Herbicide Label Directions Opposing View #12- "Glyphosate-containing products are acutely toxic to animals, including humans. Symptoms include eye and skin irritation, cardiac depression, gastrointestinal pain, vomiting, and accumulation of excess fluid in the lungs. The surfactant used in a common glyphosate product (Roundup) is more acutely toxic than glyphosate itself; the combination of the two is yet more toxic."

"Tests done on glyphosate to meet registration requirements have been associated with fraudulent practices."

"Laboratory fraud first made headlines in 1983 when EPA publicly announced that a 1976 audit had discovered "serious deficiencies and improprieties" in toxicology studies conducted by Industrial

Biotest Laboratories (IBT).44 Problems included "countless deaths of rats and mice that were not reported," "fabricated data tables," and "routine falsification of data." “44

“IBT was one of the largest laboratories performing tests in support of pesticide registrations.44 About 30 tests on glyphosate and glyphosate-containing products were performed by IBT, including 11 of the 19 chronic toxicology studies.45 A compelling example of the poor quality of IBT data comes from an EPA toxicologist who wrote, "It is also somewhat difficult not to doubt the scientific integrity of a study when the IBT stated that it took specimens from the uteri (of male rabbits) for histopathological examination." “46 (Emphasis added.)

“In 1991, laboratory fraud returned to the headlines when EPA alleged that Craven Laboratories, a company that performed contract studies for 262 pesticide companies including Monsanto, had falsified test results.47 "Tricks" employed by Craven Labs included "falsifying laboratory notebook entries" and "manually manipulating scientific equipment to produce false reports."48 Roundup residue studies on plums, potatoes, grapes, and sugarbeets were among the tests in question.” “49

“The following year, the owner/president of Craven Laboratories and three employees were indicted on 20 felony counts. A number of other employees agreed to plead guilty on a number of related charges.50 The owner was sentenced to five years in prison and fined $50,000; Craven Labs was fined 15.5 million dollars, and ordered to pay 3.7 million dollars in restitution.”48

Cox, Caroline. “Glyphosate, Part 1: Toxicology” Journal of Pesticide Reform, Volume 15, Number 3, Fall 1995 http://terrazul.org/Archivo/Glyphosate_Fact_Sheets.pdf

Herbicide Safety Testing Opposing View #81 and Herbicide Label Directions Opposing View #13 - “EPA Investigates Monsanto

An internal memorandum by an official of the U.S. Environmental Protection Agency [EPA], has accused EPA of conducting a "fraudulent" criminal investigation of Monsanto, the St. Louis chemical corporation. [1]
The 30-page memo, from William Sanjour to his supervisor, David Bussard, dated July 20, 1994, describes a two-year-long criminal investigation of Monsanto by EPA's Office of Criminal Investigation (OCI).

The Sanjour memo says EPA opened its investigation on August 20, 1990 and formally closed it on August 7, 1992. "However, the investigation itself and the basis for closing the investigation were fraudulent," the Sanjour memo says.

According to the Sanjour memo:

- EPA's investigation of Monsanto was precipitated by a memo dated February 23, 1990, from EPA's Dr. Cate Jenkins to Raymond Loehr, head of EPA's Science Advisory Board.
- The Jenkins memo said that EPA had set dioxin standards relying on flawed Monsanto-sponsored studies of Monsanto workers exposed to dioxin, studies that had showed no cancer increases among heavily exposed workers.
- Attached to the Jenkins memo was a portion of a legal brief filed by the plaintiffs as part of a trial known as Kemner v. Monsanto, in which a group of citizens in Sturgeon, Missouri had sued Monsanto for alleged injuries they had suffered during a chemical spill caused by a train derailment in 1979.
- The Jenkins memo had not requested a criminal investigation; instead Jenkins had suggested the need for a scientific investigation of Monsanto's dioxin studies. But in August 1990,

EPA's Office of Criminal Investigation (OCI) wrote a 7-page memo recommending that a "full field criminal investigation be initiated by OCI."

- Plaintiffs in the Kemner suit made the following kinds of allegations (which we quote verbatim from the Sanjour memo):

"Monsanto failed to notify and lied to its workers about the presence and danger of dioxin in its chlorophenol plant, so that it would not have to bear the expense of changing its manufacturing process or lose customers;...

"Monsanto knowingly dumped 30 to 40 pounds of dioxin a day into the Mississippi River between 1970 and 1977 which could enter the St. Louis food chain;

"Monsanto lied to EPA that it had no knowledge that its plant effluent contained dioxin;

"Monsanto secretly tested the corpses of people killed by accident in St. Louis for the presence of dioxin and found it in every case;...

"Lysol, a product made from Monsanto's Santophen, was contaminated with dioxin with Monsanto's knowledge." [The Sanjour memo says that, at the time of the contamination, "Lysol (was) recommended for cleaning babies' toys and for other cleaning activities involving human contact."]

"The manufacturer of Lysol was not told about the dioxin by Monsanto for fear of losing his business;

"Other companies using Santophen, who specifically asked about the presence of dioxin, were lied to by Monsanto;...

"Shortly after a spill in the Monsanto chlorophenol plant, OSHA measured dioxin on the plant walls. Monsanto conducted its own measurements, which were higher than OSHA's, but they issued a press release to the public and they lied to OSHA and their workers saying they had failed to confirm OSHA's findings;

"Exposed Monsanto workers were not told of the presence of dioxin and were not given protective clothing even though the company was aware of the dangers of dioxin;

"Even though the Toxic Substances Control Act requires chemical companies to report the presence of hazardous substances in their products to EPA, Monsanto never gave notice and lied to EPA in reports;

"At one time Monsanto lied to EPA saying that it could not test its products for dioxin because dioxin was too toxic to handle in its labs."...

"EPA Investigates Monsanto" RACHEL'S HAZARDOUS WASTE NEWS #400, July 28, 1994 http://www.ejnet.org/rachel/rhwn400.htm

Herbicide Label Directions Opposing View #27 - "GAO's review found that EPA and FTC make limited use of their authority over unacceptable safety advertising c aims. GAO found the same situation nearly 4 years ago and recommended that EPA take steps to strengthen and improve its program for regulating such claims. Neither EPA nor FTC is taking formal enforcement action against safety claims by manufacturers and distributors. Since 1986 EPA has taken only one formal enforcement action involving a lawn care pesticide safety claim made by a manufacturer, while FTC has taken no enforcement action in this area. EPA officials told GAO that safety advertising claims

are still a low enforcement priority because of limited resources and because other violations such as pesticide misuse continue to be its primary concern. Fm believes EPA is better able to handle pesticide safety claims because of its technical expertise and legislative authority.

FTC has not acted against claims by professional pesticide applicators, over which EPA has no authority, because it believes EPA has been successfully handling applicator claims informally through its regional offices. Although EPA and Fm officials have discussed GAO's 1986 recommendation, no formal arrangement has been made to ensure that questionable applicator claims would be given appropriate attention.

The lawn care pesticides industry is making claims that its products are safe or nontoxic. GAO's review found nine instances of safety claims, such as "completely safe for humans," made by manufacturers, distributors, and professional applicators. EPA, using its standards for pesticide labels, considers that these claims, when made by manufacturers and distributors, are false and misleading. Such claims are prohibited by because they differ substantially from claims allowed to be made as part of the approved registration. GAO believes that without an effective federal enforcement program, the lawn care pesticides industry will continue to make such claims that could, among other things, persuade consumers to purchase a service they otherwise might not use or discourage the use of reasonable precautions to minimize exposure, such avoiding recently treated areas."

"LAWN CARE PESTICIDES - Risks Remain Uncertain While Prohibited Safety Claims Continue" United States General Accounting Office Report to the Chairman, Subcommittee on Toxic Substances, Environmental Oversight, Research and Development, Committee on Environment and Public Works, U.S. Senate, March 1990
GAO/RCED-90-134 http://www.getipm.com/government/fifra-laws/gao-rpt.htm
"(Beyond Pesticides, February 17, 2011) According to a recent investigative report, a company known for conducting scientific research for the pesticide industry has, in an attempt to refute research linking pesticides to Parkinson's disease, paid a U.S. government agency, the National Institute for Occupational Safety and Health (NIOSH), to prove that certain pesticides are safe. According to the report, the company, Exponent Inc., is a member of CropLife America, a trade group that represents pesticide manufacturers, and also has worked regularly for Syngenta, which makes paraquat, one of the chemicals it is looking prove as safe. Specifically, the company is looking to refute the research which shows that even small amounts of agricultural chemicals, maneb and paraquat, when combined, can raise the risk of Parkinson's disease.

According to the report, managing scientist of Exponent, Laura McIntosh, PhD, said in an interview that the company donated the money and sought participation at NIOSH to enhance the credibility of its study of maneb and paraquat; they wanted to make their research "bulletproof." "

Beyond Pesticides Daily News Blog entry was posted on Thursday, February 17th, 2011 Source: http://www.beyondpesticides.org/dailynewsblog/?p=4965

***Response**: Citations questioning the legal validity of label requirements and pesticide regulations are beyond the scope of project analysis. The proposed project activities would follow all appropriate laws, policies, and regulations governing the use of pesticides, as required by the U.S. Environmental Protection Agency, the California Department of Pesticide Regulation, and the Forest Service Policy pertaining to pesticide-use.*

**DA-Attachment 9a J Citations without a point of debate**

Glyphosate safety opposing view #67 - "Glyphosate is no more than slightly toxic to fish, and practically non-toxic to amphibians (McComb 1990) and aquatic invertebrate animals." (page 4)

"For glyphosate and its formulations, findings are from studies conducted by the manufacturer. These studies have been presented to EPA to support product registration, but may not be available to the public. (page 5)

"Since the 1988 rating, EPA has concluded that glyphosate should be classified as having evidence of noncarcinogenicity for humans. There was no convincing evidence of carcinogenicity in new studies in two animal species (Dykstra and Ghali 1991). (page 7)

"Glyphosate Herbicide Information Profile" Forest Service Pacific Northwest Region, February, 1997 http://www.fs.fed.us/r6/nr/fid/pubsweb/gly.pdf

Herbicide Safety Testing Opposing View #75 and Herbicide Label Directions Opposing View #7- "Glyphosate is of relatively low oral and dermal acute toxicity. It has been placed in Toxicity Category III for these effects (Toxicity Category I indicates the highest degree of acute toxicity, and Category IV the lowest). The acute inhalation toxicity study was waived because glyphosate is nonvolatile and because adequate inhalation studies with end-use products exist showing low toxicity." (Pg. 2)

"Glyphosate does not cause mutations." (Pg. 2)

"EPA conducted a dietary risk assessment for glyphosate based on a worst-case risk scenario, that is, assuming that 100 percent of all possible commodities/acreage were treated, and assuming that tolerance-level residues remained in/on all treated commodities. The Agency concluded that the chronic dietary risk posed by glyphosate food uses is minimal." (Pg. 3)

"Occupational and residential exposure to glyphosate can be expected based on its currently registered uses. However, due to glyphosate's low acute toxicity and the absence of other toxicological concerns (especially carcinogenicity), occupational and residential exposure data are not required for reregistration." (Pg. 3)

"Glyphosate is no more than slightly toxic to birds and is practically nontoxic to fish, aquatic invertebrates and honeybees. Due to the presence of a toxic inert ingredient, some glyphosate end-use products must be labeled, 'Toxic to fish,' if they may be applied directly to aquatic environments. Product labeling does not preclude off-target movement of glyphosate by drift. EPA therefore is requiring three additional terrestrial plant studies to assess potential risks to nontarget plants.

EPA does not expect that most endangered terrestrial or aquatic organisms will be affected by the registered uses of glyphosate." (Pg. 4)

"Based on current data, EPA has determined that the effects of glyphosate on birds, mammals, fish and invertebrates are minimal." (Pg. 5)

"Regulatory Conclusion
The use of currently registered pesticide products containing the isopropylamine and sodium salts of glyphosate in accordance with the labeling specified in this RED will not pose unreasonable risks or adverse effects to humans or the environment. Therefore, all uses of these products are eligible for reregistration." (Pg. 6)

"R.E.D. FACTS Glyphosate" EPA publication - EPA-738-F-93-011, September 1993
http://www.epa.gov/oppsrrd1/REDs/factsheets/0178fact.pdf

***Response:*** *This citation is from the R.E.D. FACTS sheet published by EPA and from the 1997 Herbicide Information profile from the Pacific North West Region of the Forest Service. These citations do not present an argument against the proposed project or indicate an adverse effect would occur with implementation of the project proposal.*

**DA-Attachment 9a K** Citations regarding surfactants and inert ingredients

Herbicide Safety Testing Opposing View #76 and Herbicide Label Directions Opposing View #8 - "The findings of Richard et al. (2005) are an important addition to our understanding that the health and environmental effects of formulated pesticide products are not fully reflected in tests conducted on the active ingredient(s) alone. It has been long known that the adjuvants (commonly and misleadingly called "inert" ingredients) may be toxic and may enhance or supplement the toxic effects of the active pesticidal ingredient.

In the case of glyphosate-containing products, this phenomenon was well demonstrated in the data submitted to the (EPA) by the registrant (Monsanto), and summarized by the U.S. EPA in the Reregistration Eligibility Document (RED) for glyphosate (U.S. EPA 1993). For example, based on the registrant's own tests of acute toxicity to freshwater fish, the U.S. EPA classified technical grade glyphosate as "slightly toxic" to "practically non-toxic" and formulated products ranged from "moderately toxic" to "practically non-toxic." Tested alone, the surfactant adjuvant (identified as "inert") was "highly toxic" to "slightly toxic." Similar differences were reported in tests of acute toxicity to freshwater invertebrates.

Based in part on the data in the glyphosate RED (U.S. EPA 1993), the New York State Attorney General's office successfully pursued an action against Monsanto in 1996 (Attorney General of the State of New York 1996). At that time, Monsanto was making advertising claims about the toxicity of the Roundup products based on data from tests on the active ingredient alone. Such claims are scientifically unfounded and inherently deceptive. The Attorney General's action was facilitated by the availability of at least some limited information about the inert ingredients and their toxicity. That same sort of information enabled Richard et al. (2005) to conduct their study.

Unfortunately, that is not always the case, and for many pesticide products, little or no information about the identity of inert ingredients is publicly available. Registrants are generally required to conduct acute toxicity tests on formulated products, but they traditionally conduct chronic toxicity tests on the active ingredient alone. Even when formulated products are tested, the identity of inert ingredients is rarely revealed in the open literature, publicly available regulatory documents, or product labels. Therefore, independent research is stymied, and the public is ill-informed in the marketplace."

Séralini, Gilles-Eric "Issue: Cumulative Impacts to Amphibians Species" A Laboratoire de Biochimie et Biologie Moleculaire publication, Université de Caen, February 2006
http://www.signaloflove.org/clearcutting/reports/cumulativeimpactstoamphibian

Herbicide Safety Testing Opposing View #88 and Herbicide Label Directions Opposing View #20 - "Monsanto created Roundup in the 1970's to kill weeds and has since catapulted this product to be the world's number one selling herbicide. Before the patent on Roundup was set to expire in 2000, Monsanto needed a surefire way to keep the profits of Roundup from bottoming out. Monsanto quickly began purchasing the majority of the world's seed companies while simultaneously creating

GMOs that farmers needed to sign contractual agreements to only use Roundup. Subsequently, revenue from Roundup never dropped and in fact topped more than $4 billion in 2008, up 59% from 2007 [2].

GM-soy is estimated to be present in up to 70% of all food products found in US supermarkets, including cereals, breads, soymilk, pasta and most meat (as animals are fed GM-soy feed). Although Monsanto has consistently relied on industry-funded data to declare the safety of GM-soy and glyphosate, objective research published in peer-reviewed journals tells another story.

Toxicity of Glyphosate
A recently published study by Italian researchers [3] examined the toxicity of four popular glyphosate based herbicide formulations on human placental cells, kidney cells, embryonic cells and neonate umbilical cord cells and surprisingly found total cell death of each of these cells within 24 hours. The researchers reported several mechanisms by which the herbicides caused the cells to die including: cell membrane rupture and damage, mitochondrial damage and cell asphyxia. Following these findings, the researchers tested G, AMPA and POEA by themselves and concluded that, "It is very clear that if G, POEA, or AMPA has a small toxic effect on embryonic cells alone at low levels, the combination of two of them at the same final concentration is significantly deleterious."

Damato, Gregory Ph.D., "GM-Soy: Destroy the Earth and Humans for Profit"
Fourwinds10.com, May 27, 2009
http://www.fourwinds10.com/siterun_data/science_technology/dna_gmo/news.php?q=1243529527

***Response:*** *Glyphosate formulations such as Rodeo and Accord do not contain any adjuvants such as a surfactant (they contain only glyphosate and water). A separate adjuvant and/or surfactant can be combined with the glyphosate product to increase efficacy. Products proposed for use in the Blacksmith project do not have a surfactant as part of the glyphosate product, however an adjuvant is proposed as part of the application. Analysis of the additives and surfactants proposed with the project are included in the Risk Assessment for the Blacksmith Project.*

**DA-Attachment 9a L** Citations of Editorials specific to Monsanto

Herbicide Safety Testing Opposing View #72 and Herbicide Label Directions Opposing View #4 - "However, the U.S. government regulatory agencies seem to have given Monsanto a long rope. The clout Monsanto enjoys in the U.S. government is by no means incidental. According to the Organic Consumers Association, Clarence Thomas, before being the Supreme Court Judge who put George W. Bush in office (in his first term), was a Monsanto lawyer; Anne Veneman, the U.S. Secretary of Agriculture, was on the board of directors of Monsanto's Calgene Corporation; Donald Rumsfeld, the Secretary of Defence, was on the board of directors of Monsanto's Searle Pharmaceuticals; Secretary of Health Tommy Thompson received $50,000 in donations from Monsanto during his winning campaign for Wisconsin's governorship; and the two Congressmen who received the most donations from Monsanto during the last election were Larry Combest (Chairman of the House Agricultural Committee) and John Ashcroft (the Attorney-General)."

"A multinational Exposed" Frontline, Volume 22 - Issue 05, Feb. 26 - Mar. 11, 2005
http://www.hinduonnet.com/fline/fl2205/stories/20050311003312500.htm

Herbicide Safety Testing Opposing View #83 and Herbicide Label Directions Opposing View #15 - "Over twenty years ago, the dangers of Monsanto's glyphosate as well as its associated GMOs were known scientifically to cause human health difficulties and Swedish researchers years ago in the Journal 'Cancer' noted glyphosate was connected to human cancer. Anyway, many scientists and

public health workers researching it were fired. It's a mad empire's rush--the U.S empire and its corporate proxies--to desire (hell, the reality of) to own the world's food and dominate the whole world. It is destroying thousands of years of biodiversity security in the process. And Monsanto's empire of glyphosate is in virtually everything in the USA and worldwide. One foolish company, one corrupt federal government of the USA. Everyone should learn more about Monsanto in the film "The World According to Monsanto." (90 minutes). Monsanto's corporate contract should be revoked for endangering world health and killing off global crop biodiversity of thousands of years of work destroyed in one generation--in the mad rush to dominate the whole world's biodiversity.

Monsanto and the USA will go down in history as the organizations that caused most biological devastation and human suffering in human history."

"MONSANTO RoundUp (glyphosate) Empire causes BIRTH DEFECTS...in amphibian embryos, humans?" Portland independent media center, May 3, 2009
http://portland.indymedia.org/en/2009/05/391045.shtml

Herbicide Safety Testing Opposing View #87 and Herbicide Label Directions Opposing View #19 - "France's highest court has ruled that U.S. agrochemical giant Monsanto had not told the truth about the safety of its best-selling weed-killer, Roundup. The court confirmed an earlier judgment that Monsanto had falsely advertised its herbicide as "biodegradable" and claimed it "left the soil clean." Roundup is the world's best-selling herbicide.

French environmental groups had brought the case in 2001 on the basis that glyphosate, Roundup's main ingredient, is classed as "dangerous for the environment" by the European Union.

In the latest ruling, France's Supreme Court upheld two earlier convictions against Monsanto by the Lyon criminal court in 2007, and the Lyon court of appeal in 2008, the AFP news agency reports.

Monsanto already dominates America's food chain with its genetically modified seeds. Now it has targeted milk production. Just as frightening as the corporation's tactics, including ruthless legal battles against small farmers, is its decades-long history of toxic contamination."

France Finds Monsanto Guilty of Lying Infowars Ireland, November 23, 2009
http://info-wars.org/2009/11/23/france-finds-monsanto-guilty-of-lying/

Herbicide Safety Testing Opposing View #89 and Herbicide Label Directions Opposing View #21- "If you're still not convinced that Roundup is a highly toxic and persistent pesticide, read on, while at the same time remembering the other contributions that Monsanto has made to society such as:

Saccharin, Astroturf, agent orange, dioxin, sulphuric acid, polychlorinated biphenyls (PCBs), plastics and synthetic fabrics, research on uranium for the Manhattan Project that led to the construction of nuclear bombs, styrene monomer, an endless line of pesticides and herbicides (Roundup), rBGH (recombinant bovine growth hormone that makes cows ill), genetically engineered crops (corn, potatoes, tomatoes, soy beans, cotton), and it's most significant product to date; Lies, Factual Distortions and Omissions. Here's one of the distortions that Monsanto had on its website a while back. 'Sustainability - the idea that the resources and people of this world are finite. That for any business decision we make, we must consider the effect it will have on us and our children. That the products we make must not use up all of a natural resource, or even worse, contaminate what is left behind.' "

"Everything you Never Wanted to Know about Monsanto's Modus Operandi (M.O.)"

Mindfully.org http://www.mindfully.org/Pesticide/Monsanto-Roundup-Glyphosate.htm

***Response:*** *Monsanto is the maker of Roundup herbicide, which contains glyphosate. While glyphosate is proposed for use in this project, Roundup is not. Comments regarding Monsanto are not relevant to this decision.*

**DA-Attachment 9a M Citations specific to 2,4-D**

Herbicide Label Directions Opposing View #28 - "2,4-D has been evaluated by the European Union and included on its list of approved herbicides, stating inter alia that "the review [of 2,4-D] has established that the residues arising from the proposed uses, consequent on application consistent with good plant protection practice, have no harmful effects on human or animal health."[30] Concern over 2,4-D is such that it is currently not approved for use on lawns and gardens in Sweden,[31] Denmark, Norway, Kuwait and the Canadian provinces of Québec [32] and Ontario.[33] 2,4-D use is severely restricted in the country of Belize. In 2005, the United States Environmental Protection Agency approved the continued use of 2,4-D.[34] In Canada, the Pest Management Regulatory Agency (PMRA) has placed a condition of registration on 2,4-D such that the 2,4-D registrant(s) must provide the PMRA with a required developmental neurotoxicity study by September 20, 2009.[35] According to the PMRA, the due date of the study has since been extended to early 2010."

2,4-Dichlorophenoxyacetic acid Published by Wikipedia http://en.wikipedia.org/wiki/2,4-Dichlorophenoxyacetic_acid

***Response:*** *2-4-D is not proposed in this project. Citations regarding 2-4-D are not relevant to this decision.*

**DA-Attachment 9a N** Citations regarding workplace harassment

Herbicide Label Directions Opposing View #29 - "According to the lawsuit, Parker became the subject of hostile treatment by his supervisors after complaining about what he called a "systemic problem" when it came to proper pesticide use across several forests in New Mexico and Arizona."

Former Forest Service Official Files Lawsuit over Firing
by Susan Montoya Bryan Associated Press August 10, 2007
http://earthhopenetwork.net/former_forest_service_official_files_lawsuit_firing.htm

***Response:*** *Addressing employee harassment and reprisal allegations in New Mexico, Arizona or elsewhere are not within the scope of the Blacksmith decision. Forest Service policy prohibits harassment and reprisals. The latest direction, based on the March 1, 2013 Forest Service Anti-Harassment Policy from Chief Tidwell is that:*

> *"Employees have a responsibility in the prevention of harassment by ensuring they do not engage in any activity or practice that is offensive or creates a hostile environment. Employees who feel they are a victim of harassment are encouraged to report the incident immediately to a supervisor, management official, Human Resource Management office, or Civil Rights office. Once the matter has been reported, it will be promptly investigated and corrective action will be taken where appropriate. Acts or threats of reprisal against any person who reports incidents of harassment, testifies, or participates in investigations or proceedings under this policy are prohibited."*

**Opposing Views Attachment #14- Dead and Dying Trees are Important to the Survival of many Natural Resources in the Forest Dead Trees**

**DA- Attachment 14 A** Intensified forest management

> Opposing View #1 - "Intensified forest management, responding to the ever-increasing demand for forest products, will have a strong influence on the amount and distribution of woody material that remains as wildlife habitat through present and future stand rotations. Leaving the perpetuation of large down material to chance will probably result in its disappearance from the managed forests of the future, along with the loss of dependent plant and wildlife species."
>
> Bartels, Ronald, John D. Dell, Richard L. Knight Ph.D. and Gail Schaefer "Dead and Down Woody Material" Animal Inn http://www.fs.fed.us/r6/nr/wildlife/animalinn/hab_8ddwm.htm

***Response:*** *The 2004 SNFPA provides direction to determine down woody material retention levels on an individual project basis, based on desired conditions. Emphasize retention of wood in the largest size classes and in decay classes 1, 2, and 3. Consider the effects of follow-up prescribed fire in achieving desired down woody material retention levels.*

*For the Blacksmith project, design criteria were developed to meet desired conditions for wildlife, fuels, and soils. Design criteria include that:*

- *down logs greater than 16 inches in diameter within treatment units would be avoided where possible during mechanical operations, and would not be directly lit during firing operations to provide for down woody material; and*
- *Within PACs, raking of fuel accumulations around down logs greater than 30" in diameter would occur if it is determined that more than ½ of these large down logs are likely to be consumed during burn activities.*

*Additionally, as stated in the Silviculture analysis for the project snag retention guidelines and long term management of large trees will better assure long term snag and down log recruitment in the area.*

**DA- Attachment 14 B** Dead trees important to healthy forest, provide habitat, build soils and do not need to be removed to reduce fire danger

> Dead Trees Opposing View #2 - "Wuerthner has long argued that dead trees are critical to a healthy forest ecosystem and don't necessarily need to be removed from a forest to lessen the danger of catastrophic wildfires."
>
> "Wuerthner said logging as a preventive measure might slow down the infestation, but research shows that anywhere from 50 to 80 percent of the trees need to be removed if conditions are ripe for a major attack.
>
> " "So you have to ask yourself, what's the point? That is the Vietnam approach to forestry — kill all the trees so you can 'save' them," Wuerthner wrote, adding that logging isn't benign and is

expensive. "So you further have to ask whether the costs in terms of ecosystem impacts (the spread of weeds on logging roads for instance) are worth the presumed benefits." "

Byron, Eve "Wuerthner to speak on forest ecology and value of dead trees"
Published in the Helena Independent Record, November 17, 2009
http://www.helenair.com/news/local/article_7cac58d2-d339-11de-abfc-001cc4c002e0.html

Dead Trees Opposing View #5 - "The forest floor is a living, breathing factory of life and death. The out-reaching roots of a great tree search out from that chemical stew we call soil not only moisture but those elements it needs while its solar panels, or leaves, exchange carbon dioxide and oxygen.

Years later, when this aged giant completes its cycle and falls, crashing to earth, those very organisms and creatures which sustained it in life will gradually disassemble its biomass, returning to the soil those molecules which the next generation of seedlings, already sprouting, require for sustenance."

"Forest biologists such as Herbert Kronzucker, Ph.D., point out that dead and dying trees sustain the coming generations, are not a hazard, and are essential to the health of the forest." Alaskan fire management official John LeClair has noted that dead trees left standing, rather than increasing the hazard of fires, burned more slowly, retarding the conflagration in contrast to the "explosive inferno" when a live tree full of inflammable resins caught fire."

Miller, Edward W. "Savage or Salvage Logging?" The Coastal Post - September, 1998
http://www.coastalpost.com/98/9/13.htm

Dead Trees Opposing View #3 - "When many of us think of a healthy forest, we think of tall, green trees. It's hard to imagine how a tree killed by mountain pine beetle could be good for a forest. However, to be truly healthy and support all the wildlife that depends on it, there must be a variety of young, old and dead trees in a forest ecosystem. At "endemic" or normal levels, mountain pine beetles help maintain this diversity by colonizing and killing old or damaged trees, therefore kick-starting the invaluable process of decomposition. Decomposing wood returns nutrients to the system while providing shelter and food for many plants and animals. Standing dead trees host a diversity of organisms that would not be present without them."

"Dead Trees are Good Homes" Parks Canada, 2009 http://www.pc.gc.ca/eng/docs/v-g/dpp-mpb/sec1/dpp-mpb1b.aspx

Dead Trees Opposing View #4 - "Things are not always what they seem. At first glance a dead or dying tree seems like a tragic loss of a valuable resource. But on further inspection it becomes clear that a dead tree is simply a part of nature. And as a part of nature it serves an important purpose that isn't always obvious to us.

Dead trees and dead parts of trees are critically important to birds and mammals for nesting, rearing of young, feeding and as shelter. With a little forethought and tolerance we can maintain our

organized, structured lifestyle and at the same time provide wildlife the habitat it needs to survive. In the long run, we'll be the better for it."

Kreil, Randy "Bare Trees" North Dakota Outdoors, March 1994
http://www.und.nodak.edu/org/ndwild/oldtree.html

Dead Trees Opposing View #6 - "Dead and down woody materials have long been viewed by foresters as unsalvaged mortality, the utilization of which is an important objective of good timber management. This material is also viewed as a fire hazard, and steps are frequently taken to reduce the amount of flashy fuels from timber harvest areas. Woody materials are also recognized as home for small vertebrate animals that are considered "pests" which impede reforestation.

These are all valid considerations, but dead and down woody material in various stages of decay serves many important functions, one of which is habitat for wildlife. Instead of viewing logs left in a forest as unsalvaged mortality or a fire hazard, this chapter examines their role as wildlife habitat. Elton (1966, p. 279) put it this way:

When one walks through the rather dull and tidy woodlands--say in the managed portions of the New Forest in Hampshire [England]-that result from modern forestry practices, it is difficult to believe that dying and dead wood provides one of the two or three greatest resources for animal species in a natural forest, and that if fallen timber and slightly decayed trees are removed the whole system is gravely impoverished of perhaps more than a fifth of its fauna."

Maser, Chris Ralph G. Anderson, Kermit Cromack, Jr. Ph.D. Jerry T. Williams and Robert E. Martin, Ph.D. "Dead and Down Woody Material" From Wildlife Habitats in Managed Forests the Blue Mountains of Oregon and Washington http://www.fs.fed.us/r6/nr/wildlife/animalinn/hab_6ddwm.htm

Dead Trees Opposing View #7 - "Cavity trees are dead or dying trees that contain one or more holes or cavities that could be used by wildlife for a variety of purposes — nesting and raising young, denning, roosting, resting, feeding, caching food, escaping predators and hibernating."

"The majority of wildlife species that use cavities cannot excavate their own holes and rely on those created by primary cavity users or on holes that form naturally. This group is called secondary cavity users. The kestrel, some owls such as the saw-whet and barred owls, ducks such as the common goldeneye and wood duck, and songbirds like the eastern bluebird, great-crested flycatcher and white-breasted nuthatch are all secondary cavity users. Many mammals are in this category too. These include deer mice, red squirrels, grey squirrels, flying squirrels, weasels, martens, fishers, raccoons, porcupines and black bears."

Naylor, Brian, Ph.D. "Cavity Trees – Nature's Refuge" The Ontario Woodlot Association Newsletter, Winter / Spring 2006, Vol. 42 http://www.ontariowoodlot.com/pages_pdf_new/cavitytree_S&W.pdf

Dead Trees Opposing View #8 - "Dead wood and dead trees provide essential habitat for a wide variety of native animals and are important to the functioning of many ecosystems. The removal of

dead wood can have a range of environmental consequences, including the loss of habitat (as they often contain hollows used for shelter by animals), disruption of ecosystem process and soil erosion."

"Removal of dead old trees (either standing or on the ground) results in the loss of important habitat such as hollows and decaying wood (Gibbons & Lindenmayer 2002) for a wide variety of vertebrates, invertebrates and microbial species and may adversely affect the following threatened species: Broad-headed Snake, Orange-bellied Parrot, Regent Parrot (eastern subspecies), Five-clawed Worm-skink, Nurus atlas, Nurus brevis, Meridolum corneovirens, Pale-headed Snake, Stephens' Banded Snake, Rosenberg's Goanna, Pink Cockatoo, Red-tailed Black-cockatoo, Glossy Black-cockatoo, Turquoise Parrot, Scarlet-chested Parrot, Barking Owl, Superb Parrot, Masked Owl, Hoary Wattled Bat, Spotted-tailed Quoll, Eastern False Pipistrelle, Eastern Freetail-bat, Squirrel Glider, Brush-tailed Phascogale, Glandular Frog, Red-crowned Toadlet, Brown Treecreeper (eastern subspecies)."

"Removal of dead wood and dead trees was listed as a KEY THREATENING PROCESS" Schedule 3 of the Threatened Species Conservation Act 1995 [12 December 2003]. http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/threat_profile.aspx?id=20011

Dead Trees Opposing View #9 - "Birds are the most obvious benefactors of dead trees. They use snags, limbs, and logs for perching, foraging, and nesting. In some forests, 30 to 45 percent of the bird species are cavity nesters. In North America alone, 55 avian species nest in cavities. Cavity-nesting birds are classified as primary excavators (who can excavate hard wood), weak excavators (who can excavate soft, dead wood), or secondary cavity-users (who can utilize existing cavities). In Ohio, eastern bluebirds, American kestrels, and wood ducks are examples of species that rely on cavities in dead wood for successful reproduction. Other birds, such as ruffed grouse, will use logs for drumming and courtship displays.

However, birds are not the only creatures that benefit from dead wood. Mammals, amphibians, reptiles, and invertebrates seek refuge in natural cavities and dens. For example, salamanders rely on the security and dampness of soil found beneath a rotting log. Small mammals find cover and relief from the hot midday sun in dead limbs and downed wood, while spiders, beetles, worms, and microbes move and feed within the decaying matter. Additionally, fungi and mushrooms flourish on and around logs, breaking down the organic matter to release important nutrients back into the forest ecosystem.

Logs provide other important ecological functions as well. Decaying logs retain moisture and nutrients that aid in new plant growth. Young trees may sprout from a single downed limb known as a nurse log. The soft wood tissue of a nurse log offers an ideal substrate for many young trees during their initial growth and development. Logs also store energy and fix nitrogen. Furthermore, dead wood serves as a ground cover, lessening soil erosion and preventing animals such as deer from over-browsing plant seedlings."

Santiago, Melissa J. and Amanda D. Rodewald, Ph.D. "Dead Trees as Resources for Forest Wildlife" Ohio State University Extension Fact Sheet http://ohioline.osu.edu/w-fact/0018.html

Dead Trees Opposing View #10 - "Wildlife trees (dead or dying trees used for nesting, feeding, denning and roosting) go through several stages that can start with ants tunneling into the rotting centre to flycatchers perching on the bare branches. For cavity-nesting birds they are critical habitat. Some species excavate cavities for their nests, while others take over and enlarge existing holes. Many of these birds in turn help the forest, eating insects which can damage trees."

Schneider, Gary, "Dead Trees (they're still full of life)" The Macphail Woods Ecological Forestry Project, December 2008 http://www.macphailwoods.org/wildlife/deadtrees.html

Dead Trees Opposing View #11 - "Twenty years after publication of a report on wildlife habitat in managed east-side forests, Pacific Northwest Research Station scientists Evelyn Bull, Catherine Parks, and Torolf Torgersen, are updating that report and discovering that the current direction for providing wildlife habitat on public forest lands does not reflect findings from research since 1979. More snags and dead wood structures are required for foraging, denning, nesting, and roosting than previously thought. In this issue of Science Findings, Bull, Parks, and Torgersen, share their latest findings, which include the fact that snags and logs are colonized by organisms representing a broader array of plants, invertebrates, and vertebrates than was previously recognized."

Science Findings, issue twenty, November 1999 Pacific Northwest Research Station USDA Forest Service http://www.fs.fed.us/pnw/sciencef/scifi20.pdf

***Response:*** *The 2004 SNFPA provides direction to determine snag retention levels on an individual project basis for vegetation treatments and to design projects to implement and sustain a generally continuous supply of snags and live decadent trees suitable for cavity nesting wildlife across a landscape. When determining snag retention levels and locations, direction is provided to consider land allocation, desired condition, landscape position, potential prescribed burning and fire suppression line locations, and site conditions (such as riparian areas and ridge tops), and avoiding uniformity across large areas. General guidelines for large-snag retention are four of the largest snags per acre westside mixed conifer and ponderosa pine types.*

*We agree that dead trees are important components of the forest ecosystem. The Blacksmith project was designed with the criteria that standing dead trees (snags) over 16 inches in dbh that do not present a hazard for woods worker and public safety would be retained to provide for sufficient snag numbers. Based on the Silviculture analysis, the Blacksmith project under all alternatives would maintain more than twice the number of snags defined in the 2004 SNFPA in the long term, and greater numbers in the short-term.*

*We agree that all snags do not propose a risk to firefighters; however, there are conditions when large accumulations of dead trees can cause hazards to firefighters and increase the resistance to control a fire. Areas of large amounts of dead and/or dying trees would be avoided during fire suppression to reduce firefighter exposure; however, these areas still pose a threat to increased fire behavior due to several factors dependent on their state of decay. Dead trees with needles still attach would cause ignition of canopy fuels easier than that of green needle canopy due to the foliar moisture content of these fuels. Additionally, these dead trees typically have additional fuel available to burn in the canopy as the*

*smaller branch wood that is dead is available for consumption thereby increasing fire intensity. As trees lose needles and continue to decay, limb wood continues to fall to the forest floor increasing surface fuel loadings surrounding the snag. Overtime, the dead trees themselves fall to the ground increasing dead surface fuel loadings. Furthermore, standing snags themselves promote resistance to control due to spotting potential of a snag on fire. For example, during suppression operations on the 2009 Meadow Fire (Yosemite National Park), gaining control of the fire was difficult due to many snags in the area. Not only were these receptive fuel beds from lofting embers, they were also ember producers sending spot fires out approximately ¼ mile to receptive large downed woody material. Indirect tactics were needed to contain the fire to mitigate snag hazards, construct line and burn out fire line to control the fire.*

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